NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 4, NUMBER 44 NOVEMBER 2, 1987

USER SURVEY

LU 6.2 use accelerates

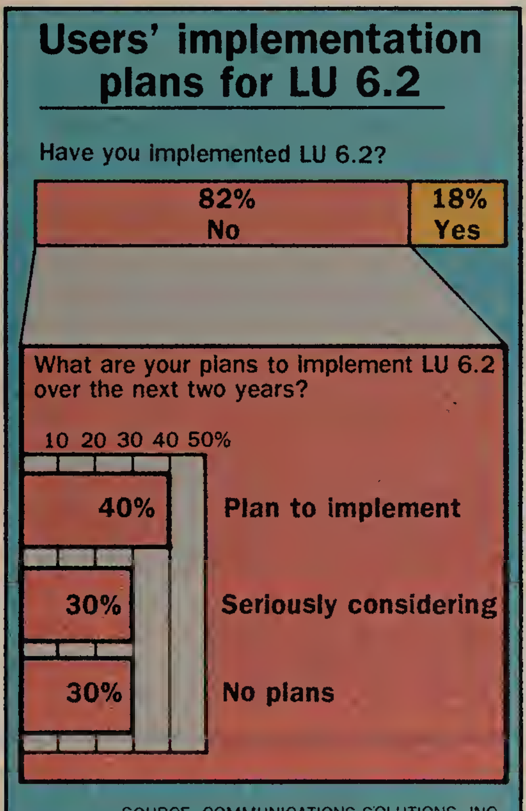
Study predicts wide acceptance.

BY PAUL KORZENIOWSKI
Senior Editor

SAN JOSE, Calif. — The increasing acceptance of IBM's LU 6.2 protocol was illustrated in a report obtained last week by *Network World* that says that within two years, more than half of the users surveyed will implement LU 6.2-based applications.

The report, "LU 6.2: Implementation, Applications and Issues," is expected to be published later this month by Communications Solutions, Inc., a software and consulting firm based here. Its findings were based on telephone interviews completed during the summer with managers overseeing Sys-

See page 4



SOURCE: COMMUNICATIONS SOLUTIONS, INC., SAN JOSE, CALIF.

CRASH AFTERMATH

Budgets menaced by Wall St. woes

No cutbacks yet, but a recession could force users to pare 1988 spending.

BY PAM POWERS
Senior Editor

Despite continued turbulence in the stock market, users said last week they have no immediate plans to cut back communications expenditures. But economic experts say the uncertainty spawned by Wall Street's troubles will slow consumer spending in coming months, a trend that may force cutbacks in network budgets.

In interviews with *Network World*, users expressed cautious optimism about the future of the economy, and most said their 1988 budget plans remain unchanged. But economists say a slowdown in consumer spending is likely. That, they added, will depress corporate revenues, limiting the funds available next year for capital equipment on major network gear such as private branch exchanges and T-1 multiplexers.

"There have been no cutbacks in our area yet," reported Steve Kelly, director of telecommunications corporate consulting with John Hancock Mutual Life Insurance Co. in Boston. "We have made no changes in the guidelines for our

See page 52

STRATEGIC SYSTEMS

Airlines wage net war on new turf

BY MICHAEL FAHEY
Senior Writer

The battle for dominance among airline reservation networks has shifted from the desktops of travel agents to the courts and Capitol Hill.

Two massive lawsuits involving most of the major airlines have called public attention to the methods competing carriers use to win over travel agents and lock them into their reservation networks. Those methods have also

See page 8

FEATURE FOCUS

Calgary constructs networks for Winter Games challenge

Complex system is set for two-week Olympiad.

BY JIM BROWN
New Products Editor

CALGARY, Alberta — Athletes who meet the XV Olympic Winter Games challenge will be rewarded with a gold medal, the cheers of the crowd and worldwide recognition. But members of a team of communications professionals building the networks to support the Games confront a different Olympic challenge, one in which the best they can hope to do is go virtually unnoticed.

If the XV Olympic Winter Games Organizing Committee (OCO'88) Technology

Continued on page 36

NETWORK LINE

News

▶ IBM plans to release two front-end processors and FEP software that offers new networking capabilities to users. Page 2.

▶ R&B Enterprises, the first user to install IBM's 9751 CBX, reports a smooth cutover but says it doesn't plan to use the PBX's advanced features in the near future. Page 2.

▶ Bridge Communications is slated to release today what it says is the first OSI-based server. Page 2.

▶ BCI Communications Systems sues Bell Atlantic and Boeing Computer Services, charging the companies violated antitrust laws and drove BCI out of business. Page 9.

Features

▶ It's a buyer's market for communications processors, and several companies are trying to lure customers with promises of better prices, performance, service and capabilities. Page 39.

▶ Data security a problem? If costly encryption devices are out of the question, the two callback devices in this week's Product Comparison may provide protection at less cost. Page 53.

NEWSPAPER

PEER-TO-PEER COMMUNICATIONS

Agency networks S/36s with APPN

Firm pioneers use of IBM tool.

BY JIM BROWN
New Products Editor

BREA, Calif. — A bill collection agency here has installed a network of IBM System/36 minicomputers based on IBM's Advanced Peer-to-Peer Networking (APPN), one of the earliest reported implementations of the network software.

Syndicated Offices Systems, Inc. uses APPN to support a network of 11 System/36s, enabling central site system operators to download data and software changes to remote systems and giving users transparent access to files and applications on machines throughout the network.

See page 9

▶ *PBX PIONEER*

First user installs IBM 9751 CBX

Cutover goes smoothly; firm declines advanced features.

BY BOB WALLACE
Senior Editor

LOS ANGELES — The first company to install an IBM 9751 CBX reports that the cutover and first week of use of the private branch exchange passed without incident, but added that the firm has no immediate plans to use any of the switch's advanced features.

R&B Enterprises, a real estate development and management company based in a converted grocery store here, is using a two-cabinet 9751 Model 20, which can handle up to 720 lines, to support 250 voice lines.

The company had originally decided to install a Rolm Corp. CBX 9000, but negotiated with IBM to have a 9751 switch installed instead for the same price.

Both R&B and the consulting firm that helped swing the deal, Robin & Dackerman, Inc. of Beverly Hills, Calif., praised IBM for its support and assistance with the implementation and cutover of the 9751.

Bruce Robin, a principal with the consulting firm, said, "IBM demonstrated a high level of support, as you might expect with a first user of one of their products." IBM also provided spare parts for the switch, equipment that may not have been available for some time.

The switch cutover went off as originally planned on Oct. 23. "It was amazingly smooth," said Gary Smith, maintenance vice-president for R&B. "Everybody came in Monday, and their phones worked."

The user also entertained switch bids from AT&T, which pitched a System 75; PacTel Information Systems, which offered a Northern Telecom, Inc. SL-1; Tel-Plus Communications, Inc., which bid an NEC America, Inc. NEAX 2400; and Fujitsu America, Ltd., which bid its Focus switch.

Although Fujitsu was the low bidder on the project, R&B opted for the IBM switch, which was priced below those bid by AT&T, PacTel and Tel-Plus. The IBM 9751 will replace a Fujitsu switch.

Initially, the IBM 9751 will support voice communications, but R&B said its MIS department will soon begin exploring ways in which the PBX could be used to switch data for the company.

Smith said that using the newly announced IBM 9755 Attendant Console will enable the company to implement moves, adds and changes of telephone stations, virtually eliminating the cost of farming out this task. He said moves, adds and changes cost R&B between $50,000 and $70,000 a year.

Smith and Robin said the 9751's small footprint and reduced power and cooling requirements were major reasons for the decision to use the new IBM product. Their belief that the switch will be able to support future Integrated Services Digital Network capabilities also attracted the two to the PBX.

R&B had originally awarded the $250,000 switch project to Rolm for a CBX 9000. In light of IBM's rumored plans to introduce a new PBX, Robin confronted IBM with his concerns about future support for the Rolm CBX line.

"We were unsure of Rolm's plans for long-term support for the CBXs," Robin said. "We wanted the new system to be supported for the next eight years. We ques-

See page 6

▶ *PRODUCT PREVIEW*

IBM set to introduce two new front-end processors

BY PAUL KORZENIOWSKI
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — IBM is gearing up to announce two new front-end processors and new software that boosts their networking capabilities, *Network World* has learned.

The front-end processor family will consist of two models, a high-end device, the IBM 2725, and a second, smaller model designed for remote communications, the IBM 2720. The products, which could be announced as early as this week, are successors to the current IBM 3725 and IBM 3720.

Although the IBM 3725 and 3720 are relatively new, they are built on the older technology of the 3705 and lack the horsepower that many IBM customers now need, analysts said.

The current products are not, for example, as powerful as competitive products from NCR Comten, Inc., industry watchers claimed. A key shortcoming is the inability of the IBM 3725 to adequately support T-1 digital transmission facilities, which operate at 1.544M bit/sec.

According to L. David Passmore, a principal at Network Strategies, Inc., a consulting firm in Fairfax, Va., the IBM 3725 cannot process information as quickly as a T-1 line can transmit it. Consequently, the front end becomes a bottleneck in some networks, and customers are using NCR Comten's products to solve the problem, Passmore said.

Analysts speculate that the IBM 2725, which has been delivered to a half-dozen beta sites, will overcome that limitation. The product should also match the capabilities

See page 6

Network World wants to make its news coverage even better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Editor Bruce Hoard toll free at (800) 343-6474.

▶ *OPEN SYSTEMS INTERCONNECT*

Bridge to release first OSI-compatible server

Based on Virtual Terminal Protocol.

BY MARY PETROSKY
West Coast Correspondent

MOUNTAIN VIEW, Calif. — Local networking vendor Bridge Communications, Inc. is expected today to introduce what the company claims is the first communications server to implement the International Standards Organization's Open Systems Interconnect (OSI) protocols.

By jumping into the OSI market early, Bridge expects to have mature OSI software available when user demand for OSI products takes off, said Judith Estrin, senior vice-president of 3Com Corp. and general manager of Bridge, a wholly owned subsidiary of 3Com.

Bridge's newest server is actually new server software. The Communications Server/1-OSI (CS/1-OSI) uses the OSI Virtual Terminal Protocol (VTP), an application level protocol, to communicate with devices on a network. No other vendor, however, currently supports VTP, Estrin said. "As people introduce products that implement VTP, the server will run with them," she said.

VTP is a draft international standard, one step away from full acceptance as an international standard, intended to allow terminals — or a personal computer emulating a terminal — to communicate with any type of host computer, Estrin noted.

The CS/1-OSI is based on Bridge's current communications server hardware and implements the OSI protocols in software. The

See page 8

Table of contents

TOP NEWS

Apollo Computer announces support for IBM's LU 6.2 protocols, along with the first third-party application to take advantage of the software. **Page 9.**

INDUSTRY UPDATE

Digital Communications Associates tries to cash in on the stock market crash by attempting a hostile takeover of Ungermann-Bass. **Page 11.**

TELECOM TRENDS

The rate of decline of business telephone costs has leveled off, after prices dropped almost 21% since divestiture. **Page 15.**

DATA DELIVERY/ NET MANAGEMENT

Researchers at Searle use Intel's Fastpath link to access and transfer data between VAXes and their IBM mainframe. **Page 17.**

LOCAL NETWORKING

IBM's System/36 mini now includes a direct Token-Ring connection that reduces the cost of supporting network links. **Page 19.**

COMMUNICATIONS MANAGER

CMA members agree they need the support, understanding and ear of management in order to maximize technology's potential for the company. **Page 25.**

NEW PRODUCTS AND SERVICES

U.S. Fax plans a packet switching-based nationwide facsimile network that is intended to cut fax calling costs by up to 74%. **Page 27.**

FEATURES **Page 36.**
CALENDAR **Page 52.**

Correction: The headline for an Oct. 19 article about Interlink Computer Sciences, Inc. incorrectly identified the company. *Network World* regrets the error.

▶ *RATE ROW*

Users hit access fee plans

Say RBHCs are engaging in strategic pricing.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Users last week accused the regional Bell holding companies of pushing for dramatic and unjustified rate increases in their recently filed 1988 annual access tariffs.

In filings with the Federal Communications Commission, users said the RBHCs are trying to sneak massive increases in special access rates through, in order to inflate profits and encourage customers to abandon private-line services in favor of switched services.

The user organizations, which included the International Communications Association (ICA), the American Petroleum Institute (API) and the Ad Hoc Telecommunications Users Committee, urged the FCC to reject the proposed access tariffs and asked the commission to investigate the RBHCs' rate-formulating methods.

"The RBHCs have priced high-capacity services above cost to achieve so-called strategic pricing objectives," API stated.

"They have failed to support their rates in an accurate and detailed manner. Without such justification, the FCC cannot determine whether the proposed rates comply with FCC rules," API added.

Strategic pricing is pricing that is not based strictly on the cost of providing a service.

ICA blamed the commission for what it said were RBHC strategic pricing practices. Had the FCC exercised greater control over the tariff review process and investigated user claims of strategic pricing in the past, "the carriers would have less incentive to file tariffs that are excessively high," the group stated.

Access charges are the fees long-distance carriers pay local telephone companies for access to their local exchange networks. Access fees are one component of the total cost of long-distance service.

The RBHCs and other local exchange carriers filed their 1988 access tariffs with the FCC on Oct. 2 ("Users, vendors blast access fees," *NW*, Oct. 12), proposing a number of changes in special and switched access fees. According to preliminary FCC figures, the cost of private-line services will increase an average of 7% to 10% as a result of the proposed access charges. The price of switched services will go down about 2%.

Industry analyst Robert Ellis, president of The Aries Group, Inc., based in Rockville, Md., told *Network World* the RBHCs are manipulating rates for high-capacity and voice-grade special access services in order to meet profit objectives.

"The RBHCs had to lower the cost of T-1 access because they were losing business to competitors that offered cheaper T-1 access rates. By lowering T-1 rates, the RBHCs lost revenue. To make up that revenue shortfall, they raised rates for voice-grade access," Ellis said.

Industry analyst Page Montgomery of Economics and Technology, Inc. in Boston agreed that the RBHCs are strategically pricing T-1 and voice-grade access services. "Last year, New York Telephone [Co.] was earning a 59% rate of return on T-1 access. This year, they dropped rates

See page 5

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LU 6.2 use accelerates

continued from page 1

tems Network Architecture nets at 207 large U.S. firms. Users were asked about the technical problems hindering widespread implementation and if they planned to install LU 6.2-based applications .

Eighteen percent of the companies said they have implemented LU 6.2 systems already, and 51% expect to have such systems up and running within two years.

"Right now, LU 6.2 resembles SNA in the early 1970s," noted John Pickens, senior communications architect at CSI. "There were questions about how widely it would be adopted while the nation's largest companies were busily installing it."

LU 6.2, which was introduced in 1982, enables two computers on an SNA network to exchange information on a peer-to-peer basis, rather than in a hierarchical arrangement. Previously, one computer controlled the flow of information in a master-to-slave relationship.

Despite the limitations cited, users expect LU 6.2 to play a critical role in the development of new distributed applications. Of the 82% of the respondents that had not implemented LU 6.2, 40% said they plan to develop applications that use the protocol within the next two years. Another 30% of the non-LU 6.2 users said they are seriously considering using the protocol. Thirty percent said they have no plans to implement LU 6.2 in the next two years.

File transfer was named by 75% of the potential users as the application in which LU 6.2 capabilities would most likely be needed. Data base access was next with 68%. Sixty-four percent said LU 6.2 would be implemented in application software; 46% said it would support electronic mail, and 43% said it would support network management.

Of the 18% of respondents using the protocol, two-thirds have been working with LU 6.2 for a year or less. Currently, the most common use of the protocol is to link two CICS applications in a peer-to-peer fashion — an application cited by 60% of current users. DISOSS, which supports LU 6.2, was being used by 49% of the current users. Only 18% of the users are working with Advanced Program-to-Program Communications/PC, which enables development of LU 6.2 applications on a microcomputer.

The major reason users are working with the protocol is that it provides a standard communications interface, a factor listed by 63% of the current users. Thirty-four percent of them also said it reduced mainframe processing requirements by distributing processing work across various systems; 26% cited improved functionality of departmental systems, and 14% expect LU 6.2 will be part of international standards. Most analysts expect LU 6.2 to be incorporated into the International Standards Organization's Open Systems Interconnect model eventually.

An overwhelming majority of current users, 94%, plan to expand their use of the protocol, and 83% plan to add more LU 6.2 applications in the next two years.

John Erlandson, director of information services at CSI, said users realize their SNA networks will have to support peer-to-peer applications in the next few years. Most users are convinced that LU 6.2 is the cornerstone of IBM's strategy for supporting these applications.

Erlandson said, however, that users are leery of working with LU 6.2 to develop distributed applications because the protocol currently has a number of shortcomings.

One limitation is the inconsistency of IBM's own implementations of LU 6.2 across its product line. Last month, the company moved to correct this problem with the unveiling of the Communications Interface, a subset of the LU 6.2 functions that the company promises to implement uniformly across the Personal System/2, System/3X and 370 product lines.

Another obstacle is that only a handful of IBM's multitude of products support LU 6.2. Products that currently support the protocol include CICS, DISOSS and APPC/PC. IBM is continuously adding LU 6.2 support to key products: The company has said in recent months it will add LU 6.2 support to VTAM, the company's teleprocessing subsystem, and IMS, a popular mainframe data base management system.

Also, developing LU 6.2 applications requires a great deal of effort and a skilled programming staff, and many companies are hesitant to make such a substantial investment. Consequently, according to the report, 70% of the companies not currently using LU 6.2 said they would rather purchase LU 6.2 applications than write their own software. Few LU 6.2 applications are currently available, but more than half of the respondents said they expect them to be available in two to four years.

The report costs $395, and more information is available at (408) 559-1118.

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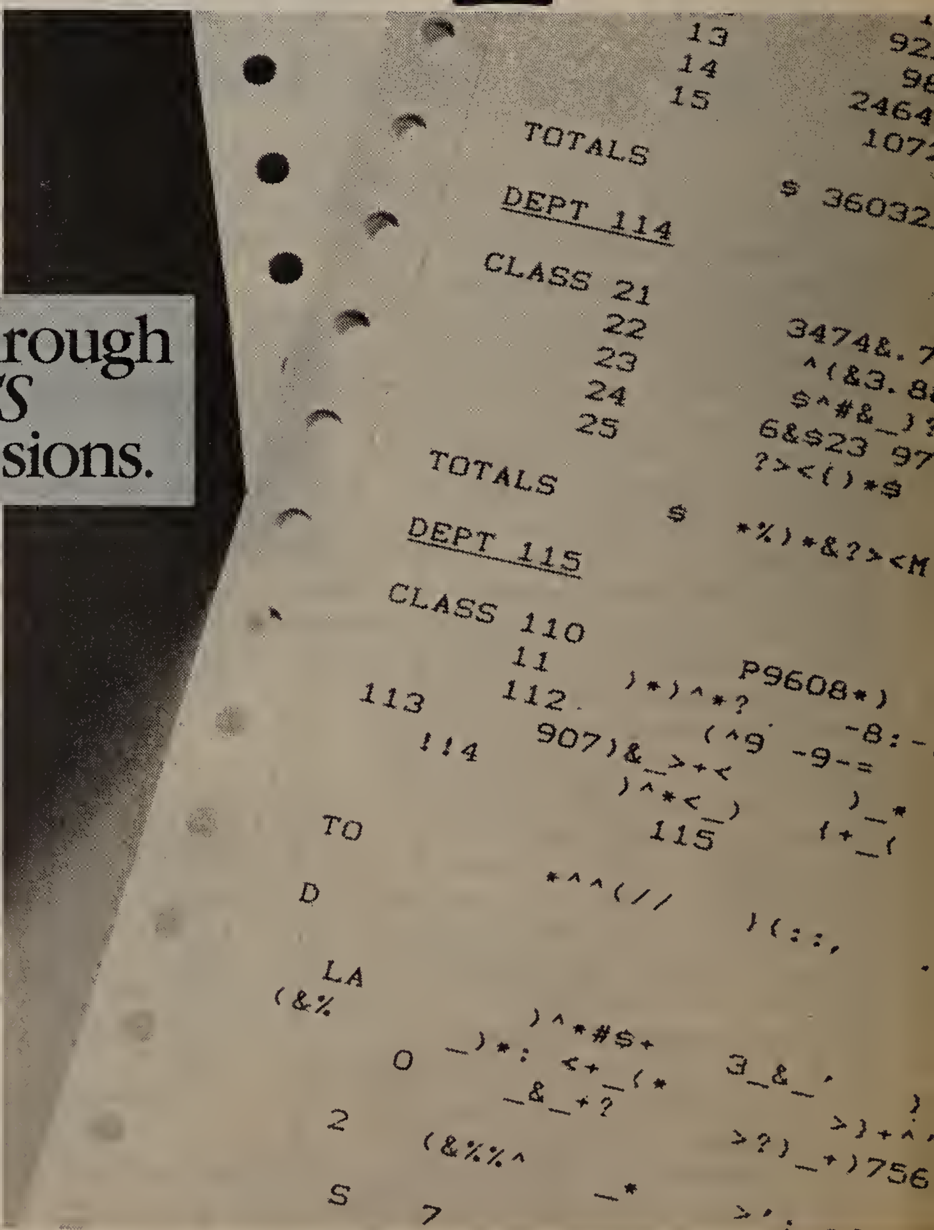

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Users hit access fee plans

continued from page 3

because of competitive pressures, but they are still earning about 33%, which is more than the 12% rate of return allowed by the FCC," Montgomery said.

AT&T, the largest user of RBHC access services, estimated in its FCC filing that local exchange carriers overstated their access rates by at least $1.15 billion. Under the proposed tariffs, AT&T's cost for special access would increase by $218 million and switched access would go up by $142 million — price hikes that, no doubt, would be passed on to AT&T's long-distance customers.

"The proposed access tariffs would subject customers to extraordinary access charge increases," AT&T stated.

"They contradict expectations that 1988 tariffs would result in a substantial overall reduction in customers' access expenses and also raise questions of lawfulness," AT&T said.

The RBHCs argued they have to increase the price of voice-grade access because usage is expected to decline sharply in 1988. The RBHCs will have a smaller customer base from which to recover costs and, therefore, must charge customers more.

In some cases, RBHCs are increasing voice-grade private-line access rates by as much as 60%.

▶ *SCIENTIFIC APPLICATIONS*

Mobil to network PCs and supercomputers

BY PAULA MUSICH
Senior Editor

DALLAS — Mobil Exploration and Producing Services, Inc. (MOEPSI) is devising a plan to put personal computers on the desks of all company professionals and to provide some with network links to supercomputers.

The so-called PC networking project, still in its infancy, is intended to support the communications requirements of geologists, geophysicists, applications developers and managers in MOEPSI, which employs roughly 1,000 people and provides technical and computing services for Mobil's exploration and oil production operating units.

Although it's too soon to tell how many of the personal computers will be networked, the company is reviewing which networks, if any, would meet its needs.

Systems analysts in the data communications and real-time systems group — part of MOEPSI's technical computer center — are now conducting a thorough needs assessment for the project, which will take into account local communications requirements and personal computer-to-host communications requirements.

Two-pronged approach

"Our approach is two-pronged: We're looking at PCs communicating with one another, sharing a file repository and peripherals, and being able to access higher level computing resources," explained Bill Martin, data communications supervisor. "We want to learn how to give PC users access to shared files and peripherals, to communicate with one another and still be able to talk to the host computers."

Currently, personal computers are operating in stand-alone mode or connected via dedicated asynchronous links to Digital Equipment Corp. VAX or Control Data Corp. (CDC) Cyber systems serving as front-end processors to Cray Research, Inc. supercomputers.

Mobil scientists access the CDC and DEC systems by using their microcomputers to emulate terminals and prepare batch processing jobs that are later submitted to the Cray supercomputer. Applications include processing of seismic data and reservoir simulation and modeling.

This has proved to be a slow and cumbersome approach that handcuffs the processing capabilities of the personal computers. "It's not enough anymore to have a PC emulating a terminal — there's too much power there to view it that way," Martin said.

According to computer systems analyst Jim Vatteroni, Mobil wants to enhance the ways technical users access and work with the Cray supercomputers. "We want to use higher speed local networks to make the transfer quicker and improve the interaction with the application program on the host computers — the Cyber, VAX or Cray," he said.

"If users can view some of the simulation information running on the Cray in a graphic form on the PC, they can alter the simulation program as it progresses," he explained.

See page 6

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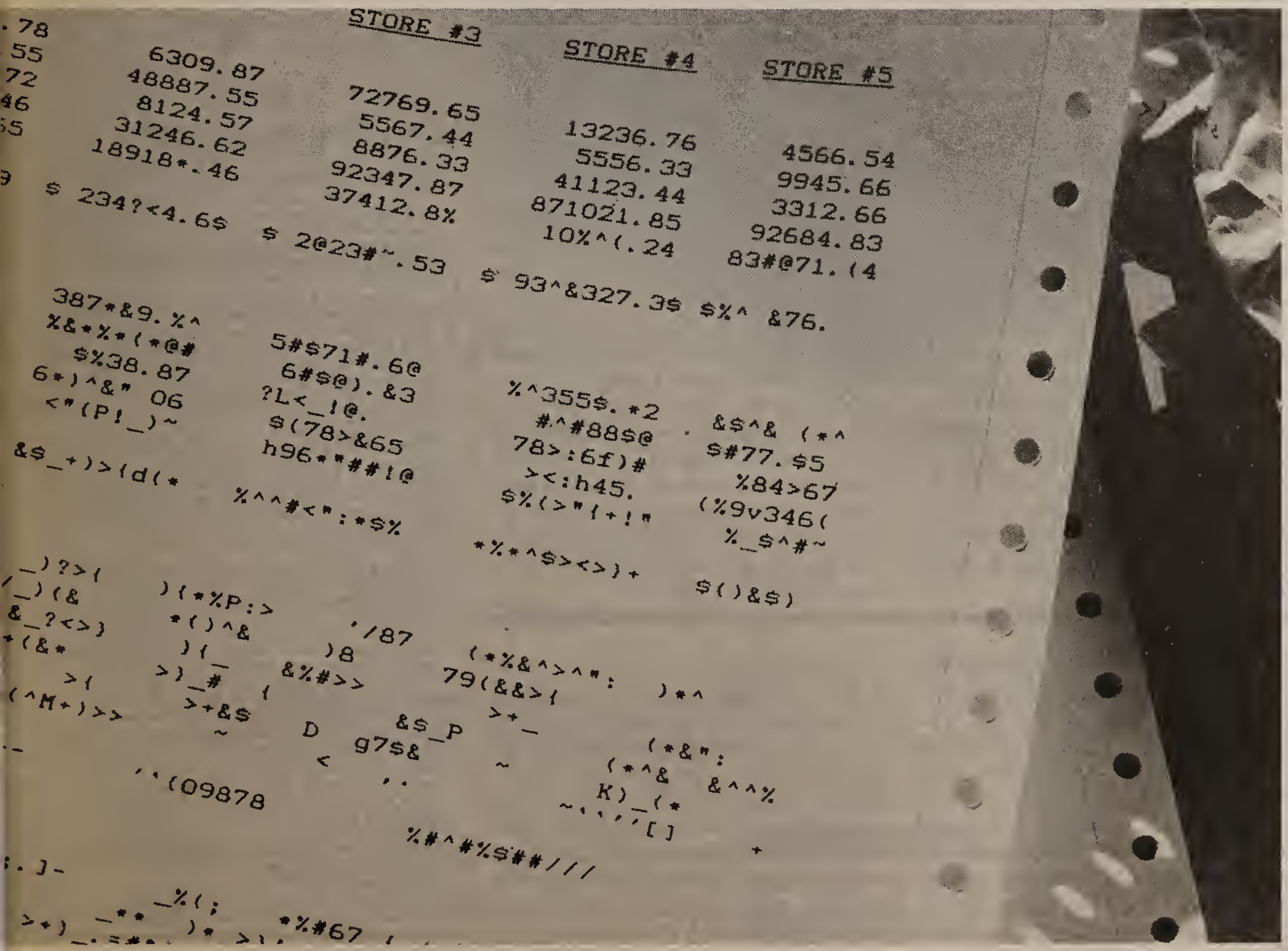

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▶ *TARIFF TRIMMING*

MCI counters AT&T's T-1 volume discounts

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — MCI Communications Corp. announced plans last week to begin offering 10% to 35% volume discounts on T-1 Terrestrial Digital Service (TDS) in response to a similar plan launched by AT&T in August.

MCI intends to file the Network Pricing Plan tariffs with the Federal Communications Commission Nov. 2 and plans to make the pricing option available starting Nov. 16.

Under the discount plan, MCI will require T-1 customers to commit to spending between $25,000 and $750,000 per month on T-1 service for a period of one, three or five years.

Discounts vary, depending on usage and length of commitment. Users making the highest monthly service commitment, $750,000, will receive the greatest discount, according to MCI spokesman John Houser.

MCI currently has a 3% to 5% volume discount plan for T-1 service that offers price breaks to those who lease individual TDS circuits for one, two or four years. Customers do not have to commit to a monthly dollar volume of service.

Houser said the new discount plan is in response to AT&T's recent action and that its discounts will be greater than AT&T's. For example, a customer using a 300-mile T-1 circuit with a monthly bill of $50,000 will save 23%, compared with similar AT&T service, Houser said.

AT&T's discount plan, filed on Aug. 31 and approved by the FCC last month, requires customers to commit to contracts ranging from one to five years.

A customer who commits to spending $2 million per month on Accunet T-1.5 will earn the maxium discount.

"This is a new concept for us," said Roy Gamse, MCI vice-president of services marketing. "Our TDS customer will commit to a set dollar amount of usage rather than to specific circuits. As a result, customers can add circuits as their network requirements change. This gives our customers greater flexibility in managing their T-1 networks."

Customers can add or disconnect circuits with only 90 days notice. "The customer no longer has to plan a year or more in advance," Gamse said. "Networks can be optimized much more often as traffic patterns and business needs change."

Mobil networks

continued from page 5

In order to make such capabilities a reality, and at the same time balance these against the need for local file and resource sharing, the project is drawing on the expertise of different professionals within Mobil.

"We're talking with the mainframe application development groups here to determine what they view as needs and requirements in communicating between PCs and host applications," Martin explained. "And we're also working with systems analysts knowledgeable about PC software and data communications. We're bringing those two areas together to identify a matrix of requirements and to fit those onto a pilot project to determine resource requirements, performance characteristics, limitations — the things it will take to be successful in doing this," he said.

Project addresses three issues

In carrying out a pilot installation, Martin said, the project will address three primary issues. "One is better connectivity between workstations and between workstations and hosts," Martin said. The second issue is "improved functionality, such as file transfer and application-to-application communications. The third is improved performance — 19.2 asynch is a limiting factor when we talk about transferring sizable data files to or from a PC to a data base or host computer," he said.

Such a solution will require bringing together equipment from many vendors as well as developing software to fill in the missing pieces. "We realize there isn't one solution out there that gives you total connectivity, functionality and performance — it's still not there," Martin said. "Our objective is to look at systems or tools available in the market that let us start addressing our goals and identify the products that help us solve those problems."

First user

continued from page 2

tioned the viability of the CBX product line in light of the pending announcement of the IBM switch."

Robin said he had heard speculation that IBM was about to unveil a new switch before winter. "We wanted our client to be at the beginning of the cycle of a new product, not at the tail end of an old product."

Robin approached IBM to discuss the possibility of IBM doing what he termed "a quick ship" of the new switch that would allow the cutover of R&B's switch to take place as scheduled on Oct. 23. "It took some leveraging and persuasion" to get IBM to agree to the endeavor, he said.

After receiving the IBM go-ahead, Robin explained the situation to Smith. "Bruce told me that IBM had a new switch on the way. It didn't make any sense for us to go ahead and purchase a switch that was going to be replaced." He said the decision to use the 9751 instead of the CBX 9000 was an easy one. "But it was a decision we would not have been able to make had we been running this project on our own, without Robin & Dackerman."

IBM FEPs

continued from page 2

of NCR Comten's 5660, which supports 1,056 ports and features 16M bytes of internal storage. The IBM 3725 controls 400 ports and has 3M bytes of internal storage.

The IBM 2725 is also expected to support the IBM Token-Ring Network, and X.25, V.35 and RS-232 interfaces. The 2720 is expected to support 64 ports, have 6M bytes of random-access memory and support the Token-Ring, as well as V.35 and RS-232 interfaces. The smaller device is not expected to include X.25 or T-1 support.

IBM was not available for comment late last week.

Analysts said the new front ends will play a key role in IBM's plans to open its network architecture to other vendors without losing network control. Unlike IBM's current processors, the 2725 and 2705 will perform many routing functions in a Systems Network Architecture network, capabilities that will become increasing important as IBM migrates SNA from a hierarchical to a peer-to-peer net.

Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C.-based consulting firm, predicted the new front-end processors will be accompanied by the announcement of a new release of IBM's Network Control Program (NCP), which is software that functions as an operating system for a front-end processor.

The new software will add PU 2.1 capabilities to the front ends and complement IBM's recent addition of LU 6.2 support to VTAM. Those features will enable the products to route messages to other front-end processors, IBM System/36s and IBM System/38s. Previously, only a host could route messages between two devices.

Analysts speculated that both front-end processors will be able to run the same NCP software. Currently, the 3725 and the 3720 run separate versions of NCP software.

It is likely the IBM 2725 and IBM 2720 will also be able to run previous versions of NCP. "IBM has to provide its users with a migration path," Passmore said.

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Bridge to release first OSI server

continued from page 2

CS/1-OSI acts as both a terminal server and a front-end processor to host computers, so hosts do not need to be running VTP-compatible software.

"As other vendors come out with products and people begin to implement OSI, we'll have a level of maturity and experience with our software that other vendors won't," Estrin said. She noted that this strategy "worked very well for us with TCP/IP." In addition, Bridge believes being early to market will help push the OSI standards, Estrin said.

Another key reason for offering an OSI-based server at this time is that many customers want assurance they'll be able to upgrade to OSI easily, Estrin said. The CS/1-OSI is "a clear demonstration that OSI can run on the same hardware we're shipping today with TCP/IP support," Estrin noted. However, she added, "I don't recommend that somebody buy OSI today for a production network. I think people will buy the OSI software to gain experience."

As part of supporting VTP, vendors must also support a general terminal type, Estrin noted. Bridge has implemented the Telnet terminal type, which is the first terminal type defined by ISO, she said. The ISO Telnet terminal type is very similar to the Telnet application popularly used with TCP/IP.

The CS/1-OSI can connect up to 64 devices, including terminals, personal computers, printers, ports on host computers and modems, for any combination of asynchronous, bit- and character-synchronous, and IBM 3270 Category A or compatible devices. The CS/1-OSI uses the same hardware architecture as Bridge's TCP/IP and Xerox Network Systems (XNS)-based servers. The OSI protocols are implemented in software and loaded into the CS/1-OSI via a floppy diskette. By implementing the OSI protocols in software, Bridge will be able to update its protocol implementation to accommodate changes in standards, Estrin said.

The communications server is also compatible with the Technical and Office Protocol Version 3.0, a specification of the OSI protocols layered over IEEE 802.3 (Ethernet). A token-ring (IEEE 802.5) version of the server and a version for Bridge's 5M bit/sec carrier-sense multiple access with collision detection broadband local network are also available.

The CS/1-OSI is priced from $9,900 for an eight-port version to $16,000 for a 64-port version, plus a $250 OSI software fee. Users of Bridge's TCP/IP and XNS-based CS/1 servers can upgrade to OSI software for $250. ◼

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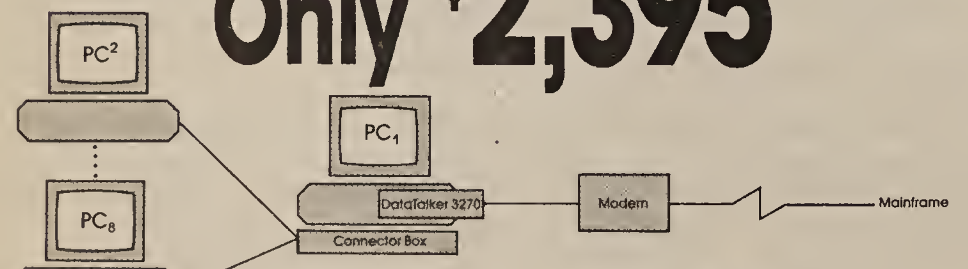

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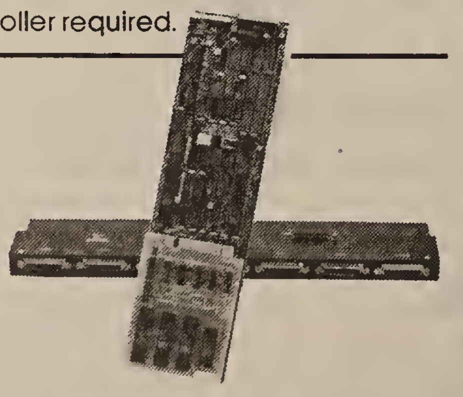

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Airline net war on new turf

continued from page 1

come under congressional scrutiny. A bill currently under consideration in Congress seeks to limit the control reservation network providers can exert over travel agents.

The legal and legislative wrangling illustrates the problems that can arise when one company uses its network for a competitive edge and a host of competitors follow suit. The heated infighting also points out just how important reservation networks have become in achieving success in the airline industry.

Getting travel agencies to use a reservation network is important because agents generally book a majority of their customers on the airline that supplies their reservation system, according to Francis Goranin, president of the American Society of Travel Agents.

The networks are also very profitable for air carriers. The airlines collect a fee each time a travel agent books a hotel room or rental car using the system. And, if a travel agency books a customer on a rival airline, the rival must pay a fee to the network provider.

Typically, this fee is about $1.75 for each segment of a passenger's trip, according to John Hotard, a spokesman for American Airlines, Inc. If a passenger were to fly from Boston to Los Angeles, with a stopover in Chicago, for example, the flights to and from Chicago would each be considered segments, Hotard explained.

"You don't have to be a genius to figure out that the more terminals you have out there, the more people you can have flying around on your airline and the more money you can get from other carriers," Hotard said.

Because of the fees generated, the reservation networks have become important to the carriers as revenue-producing businesses, as well as a means of putting additional passengers in their airplane seats, according to John Testa, vice-president of the DMW Group, Inc. in Denver and an expert on computerized reservation networks. Many of the large carriers have created separate business units to manage the networks.

The court cases stem from the tough tactics reservation service providers use to keep travel agents on their networks. Generally, when travel agents seek to win release from a typical five-year contract, they must pay the airlines for the cost of removing the networking equipment and for lost equipment rental fees. In addition, the agents must pay the estimated amount of money the reservation network provider will lose as a result of not collecting booking fees from rival airlines whose passengers would have been booked through the network.

The methods of arriving at these estimated fees, called liquidated damages, vary, depending upon the airline. Usually, the fees are based on the number of reservation system terminals an agency uses. According to Donald Sohn, president of Heritage Travel, Inc. in Cambridge, Mass., the cost of terminating a reservation network contract can run into millions of dollars for a large travel agency.

In November 1984, a group of 12 airlines filed a $1.6 billion suit in a California federal district court against American Airlines and United Air Lines, Inc., charging that the two carriers violated antitrust laws by using their reservation systems to restrict and eliminate competition in the airline industry. The case is expected to go to trial in May.

American Airlines recently filed suit in federal district court in Fort Worth, Texas, seeking millions of dollars in actual damages and $100 million in lawyers' fees and punitive damages, on the grounds that Texas Air Corp. has illegally induced travel agents to leave America's Sabre System and sign on with Texas Air's System One.

On the legislative front, the Airline Passenger Protection Act of 1987 was recently approved by the U.S. House of Representatives and has been sent to the Senate. The legislation would eliminate so-called "rollover clauses," which require that travel agents sign new, five-year contracts whenever new services or equipment, such as terminals, are provided by the reservation network vendor.

The effect of the rollover clauses is that the agencies are always in the early years of five-year contracts with the reservation network providers. Since liquidated damages are based on the time remaining in a contract, the rollover clauses ensure that liquidated damages are kept at a high level, discouraging travel agents from ending their contracts with the carriers.

The bill also contains a provision outlawing carriers from using flight time as a means of determining the order in which it will be displayed on a reservation network.

According to a Congressional Aviation Subcommittee source, some airlines falsify flight lengths so their flights can be listed ahead of their rivals on computerized reservation systems.

A provision limiting the damages an airline could collect from a travel agent to equipment removal costs and rental fees was eliminated from the bill afer heavy lobbying by American Airlines, United Air Lines and Trans World Air Lines, Inc., according to a congressional source, who asked not to be named.

American Airlines' Sabre System is the largest reservation network, followed by United Air Line's Apollo System. Together, the two networks carry 68% of all computerized reservation system traffic. Texas Air's System One is the third largest reservation network. A system owned by Delta Air Lines, Inc. and one owned jointly by Northwest Airlines, Inc. and Trans World Airlines are the other major industry networks. ◼

▶ *INDUSTRY INSIGHTS*

Firm sues BOC, Boeing

Charges giants violated antitrust laws.

BY KARYL SCOTT
Washington, D.C. Correspondent

HUNTSVILLE, Ala. — Tiny BCI Communications Systems, Inc., based here, is suing Bell Atlantic Corp. and its subsidiary Bell Atlanticom Systems, Inc., as well as Boeing Computer Services Co. for $30 million, claiming the industry giants violated antitrust laws and drove the company out of business.

BCI filed a civil suit in the U.S. District Court of Alabama in October 1986 charging Bell Atlantic and Boeing with fraud, breach of contract, interference with contractual relations and conspiracy to defraud. Boeing and Bell Atlantic declined to comment on the suit.

BCI, founded in 1984, was primarily involved in installing private branch exchange systems and inside wiring and worked almost exclusively for Bell Atlantic. Last week, the company laid off its last employee, according to BCI President Frank Machnick.

The company's case, now in the discovery phase — in which parties in the suit submit evidence to the court — is scheduled to go to trial in April 1988. The suit stems from a 1984 partnership of BCI, Bell Atlantic and Boeing Computer Services formed to bid on a multimillion dollar network contract with the National Aeronautics and Space Administration.

In March 1985, Boeing won a $225 million, 10-year NASA contract to develop the Programs Support Communications Network, according to a NASA contracting officer who asked not to be named. The now-completed network connects 15 NASA facilities throughout the U.S. and provides users with integrated voice, data and video transmission capabilities.

Boeing hired Bell Atlanticom as a subcontractor to furnish and install PBXs at the NASA Marshall Space Flight Center in Alabama. Bell Atlanticom, the telephone equipment marketing subsidiary of Bell Atlantic, hired BCI as a subcontractor to perform the inside plant wiring at Marshall.

BCI had completed only two-thirds of the work when Bell Atlanticom terminated BCI's contract. Bell Atlantic said it would perform the remaining wiring work itself.

BCI claims Bell Atlanticom breached its contract and still owes approximately $1 million for work completed prior to the contract termination, according to Machnick. Bell Atlanticom has offered to settle the case out of court on two occasions for much less than what is owed, Machnick said.

BCI also alleges the costs incurred by Bell Atlanticom in the installation of the remaining inside wiring at Marshall were substantially less than the amount Bell Atlanticom would have paid BCI, but Bell Atlanticom continued to bill Boeing, who ultimately charged NASA the original, higher price.

Because Bell Atlanticom breached its contract with BCI and suppressed the fact of its lower costs to Boeing, Bell Atlanticom knowingly allowed a fraudulent

See page 51

▶ *PEER-TO-PEER NETWORKS*

Apollo unveils IBM LU 6.2 software

BY PAULA MUSICH
Senior Editor

CHELSMFORD, Mass. — Technical workstation vendor Apollo Computer, Inc. announced its support last week for IBM's LU 6.2 protocols and announced the availability of the first third-party application that takes advantage of the software.

Apollo's Domain/LU 6.2 software is an implementation of IBM's LU 6.2 and PU 2.1 protocols, which support peer-to-peer communications between dissimilar systems. The software, when used in conjunction with applications written to its application program interface (API), enables programs running in Apollo workstations to communicate with IBM processors without requiring the Apollo systems to emulate IBM terminals.

"Using our Domain LU 6.2 software, end users are free to write any application they want — such as electronic mail, file transfer or distributed data bases — that uses the LU 6.2 network," said Sam Alunni, Apollo's senior product manager for IBM connections.

Applications that use the LU 6.2 network can be written in FORTRAN, C and Pascal, according to Alunni. For an application that has to reside on two machines, users write one module for the Apollo workstation and another cooperating module that runs in the host, such as a System/370, and those programs communicate using the LU 6.2 API, Alunni said.

"Large companies know LU 6.2 is going to be the basic protocol IBM will use in its SNA network," Alunni said. "If you have to plug into IBM, you have to use these protocols. Our customers are planning for that. They're looking to design electronic mail applications, file transfer and distributed data base applications that use the LU

See page 51

Agency networks S/36s with APPN

continued from page 1

The network has helped Syndicated Office Systems agents boost the number of overdue bills they collect by as much as 15%.

APPN, which runs under the System/36 operating system, works in conjunction with IBM's Advanced Program-to-Program Communications to enable applications on one System/36 to access and communicate transparently with programs on other machines on a peer basis.

With APPN, Syndicated Office Systems' computer operators are able to invoke system commands to log on to remote System/36s at the end of each day and instruct them to generate reports detailing the number of bills collected. Those reports are sent via APPN to the central site, where they are printed.

In addition to allowing operators to distribute software program changes, the company is developing a tool to enable agents to forward account information from one location to another, said Jerry McLaughlin, programming supervisor. By doing that, the company will be better able to track late bill payers who move to different regions of the country.

"With APPN, we can do about 90% of what we need to do remotely. The other 10% of the time we have to get somebody physically involved at the site," McLaughlin said.

To create the APPN network, McLaughlin loaded APPN on each System/36. He then defined the physical network configuration, the parameters of the phone lines used in the network and built the routing tables needed to establish links between each System/36.

The implementation did not require changes in any of the firm's existing applications, McLaughlin said. Instead, users still request a file from within an application.

Typically, the System/36 will search for that file locally and return a message to the user if that file is not found. With APPN, however, once a file has not been found locally, the system will look for the file name in a network resource directory. Once located, APPN will transparently establish a path from that System/36 through a series of others until it reaches the system holding that file. Then it will return the file to the local user.

The network of System/36s replaces the firm's leased-line network used to link terminals in its California, Texas, Arizona, Louisiana and Florida offices to a single data base on a System/38 here, McLaughlin said. Terminal response time was slow with that system, and if the System/38 failed, the whole network would have ground to a halt. There was also the chance that a few offices could be idled if one of the system's several multidrop lines went down.

As each System/36 was installed, the company used the System/38 to download files about late bill payers who lived in the area served by the respective offices.

"The plan is to hold summarized information from all the branches in the corporate system, for reporting purposes, and to keep the working data bases at the remote sites," McLaughlin said.

"With APPN, we can do about 90% of what we need to do remotely."

Branch office System/36s provide better terminal response time and insulation from communications line failure or failure of the corporate System/36. This enables the company to achieve higher productivity levels.

"The next phase is to figure out what type of information we need to collect from each remote site on an hourly, daily and weekly basis," McLaughlin said. Once those objectives are defined, he said, a set of applications can be built that will enable the corporate System/36 to extract data from remote System/36s and pass it via APPN to the corporate System/38, which will then generate and print reports.

The firm uses IBM 3865 modems, along with four multidrop and two point-to-point 9.6K bit/sec leased lines, to link the remote System/36s to the corporate System/36 here. That corporate System/36 acts as the hub of the APPN network.

McLaughlin configured the corporate System/36 to maintain the routing tables for all other System/36s in the network. This forces each System/36 in the network to connect to the hub before being routed to its destination.

The task of building an APPN network was not an easy one, McLaughlin said. IBM delivered APPN late in 1986 but has yet to publish complete documentation on its use. "When we bought APPN, there wasn't a great deal of information available on what it was or how it worked," he said.

However, McLaughlin was able to obtain a manual for an early version of the product. But that manual did not reflect changes IBM made to the product before it was delivered to end users.

"It took a lot of guesswork, experimentation and a few phone calls to IBM in Dallas and Atlanta before we could get this running," McLaughlin said. Because there is no up-to-date documentation on the product, McLaughlin said he wonders if his network is delivering all the capabilities of APPN. "But nobody knows," he said.

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INDUSTRY UPDATE

In search of excellence

US West will contribute $20 million over a five-year period for support of primary, secondary and postsecondary education in its 14-state region. The regional Bell holding company will also establish a fellowship program designed to recognize and stimulate excellence in teaching. Other companies, including Nynex Corp., have taken on the cause of improving education in the wake of recent concerns that the quality of the U.S. educational system is on the decline.

ACQUISITION ATTEMPT

DCA tries hostile takeover of UB

Ungermann-Bass stock now vulnerable.

BY PAM POWERS
Senior Editor

SANTA CLARA, Calif. — The stock market crash put Ungermann-Bass, Inc. on the defensive last week when Digital Communications Associates, Inc. (DCA) launched a hostile takeover bid for the local network vendor.

The acquisition attempt is the first instance of a communications vendor falling prey to an unsolicited takeover bid after its stock price fell. Analysts had predicted earlier that some large vendors would seek to extend their holdings in the wake of the stock market tumble ("Stock plummet spells trouble," *NW*, Oct. 26).

DCA, which in recent weeks has acquired one million shares of Ungermann-Bass stock, proposed a merger between the two companies, under which the latter firm would merge with a wholly owned DCA subsidiary that DCA officials would not identify. Analysts said Ungermann-Bass probably would be merged with DCA's recently acquired Fox Research, Inc., now called 10Net Communications, Inc.

DCA offered Ungermann-Bass shareholders $9.75 per share, the equivalent of $175.5 million, for the merger. That price exceeds both the $6.87 at which Ungermann-Bass shares were trading at the time of DCA's offer and the $8.50 per share commanded before the market plunge on Monday, Oct. 19. At its height in March, Ungermann-Bass stock traded at $15.87.

In a statement issued last Monday, Ungermann-Bass President and Chief Executive Officer Ralph

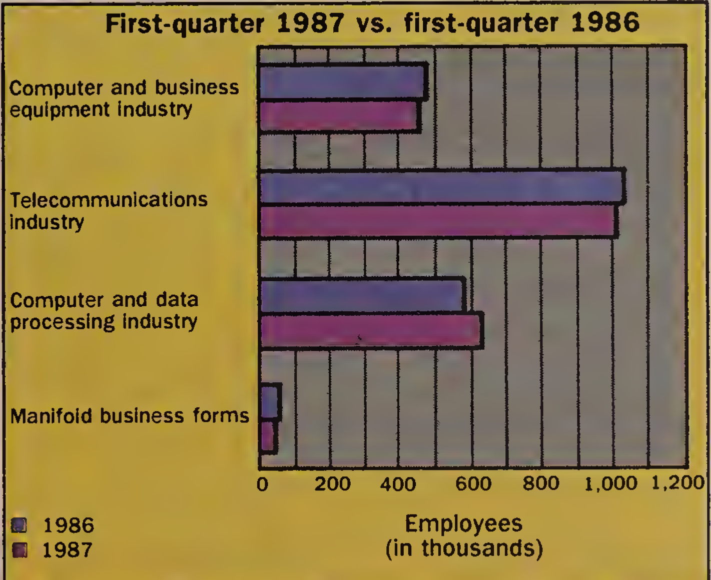
See page 12

IN BRIEF

Western Union Corp. reported net income of $2.6 million for its third fiscal quarter ended Sept. 30, 1987, compared with a $46.5 million net loss recorded for the similar quarter in 1986. The company said its results include a gain of $25 million on the sale of certain cellular telephone interests. The net loss of **Western Union Telegraph Co.,** stated separately, was $16.3 million for the third quarter, compared with a loss of $28.9 million for the third quarter of 1986.

Separately, Western Union and **Lebow Industries** said Robert J. Amman will assume the post of president and chief operating officer and will join the board of directors at Western Union upon completion of the company's restructuring, which calls for an equity investment of $25 million by private investor Bennet S. Lebow and the merger of ITT World Communications, Inc. with Western Union. It also calls for a merger of Western Union Corp. into its subsidiary, Western Union Telegraph Co., and a buyout of Western Union's outstanding bank debt at an agreed upon discount.

Employment trends



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INFORMATION SERVICES

RBHCs prod Greene on restrictions

Carriers seek larger role in information services.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The regional Bell holding companies recently urged U.S. District Court Judge Harold Greene to allow them to play a bigger role in the emerging information services industry.

The RBHCs and a number of other organizations, including consumer groups, information service providers and long-distance carriers, filed comments on Oct. 15 regarding a September ruling by Greene that gave the RBHCs limited freedom to participate in information services.

Greene, in his triennial review of Modified Final Judgment line-of-business restrictions, said the RBHCs cannot offer so-called content-based information services but can provide transport services to other vendors of information services. Greene said the decision will make information services more widely available and more affordable.

In outlining the RBHCs' role, Greene said the carriers may provide such services as data transmission, address translation, protocol conversion, introductory menus and billing management to information service providers.

In addition to loosening the information service restrictions somewhat, Greene permitted the Baby Bells to enter nontelecommunications businesses. Greene upheld the Modified Final Judgment restrictions on RBHC participation in the long-distance and telecommunications equipment manufacturing markets.

In their filings, which outlined how they will implement Greene's order, the RBHCs said they should be allowed to offer a broader array of information-related services.

Tymnet/McDonnell Douglas Network Systems Co., US Sprint Communications Co., MCI Communications Corp., CompuServe, Inc., the Association of Data Processing Service Organizations

See page 13

JOINT VENTURES

AT&T, Sun set chip, Unix deal

AT&T to use Sun microprocessor.

BY JOSH GONZE
Staff Writer

NEW YORK — Aiming to bolster its faltering minicomputer line, AT&T recently announced a two-part agreement with Sun Microsystems, Inc. that gives AT&T rights to Sun's advanced microprocessor design and calls for the vendors to work toward merging their implementations of the Unix operating system.

The announcement came less than a week after AT&T announced a major reorganization of its computer operations. AT&T's newly renamed Data Systems Group now reports directly to AT&T Vice-Chairman Randall Tobias and sells computer gear only ("AT&T retools computer unit," *NW*, Oct. 19). In the past, AT&T's computer division reported to the Business Markets Group, which is also responsible for communications equipment.

Under the terms of its agreement with Sun, AT&T will be able to manufacture and market microprocessors based on Sun's Scalable Processor Architecture (SPARC), a chip architecture that uses reduced instruction set computing (RISC) technology. RISC chip technology cuts the number of lines in operating software by more than 50%, increasing the computer's operating efficiency, according to spokeswomen at Sun and AT&T.

The SPARC chip, already incorporated in Sun's 10 million instructions per second Sun-4/260 model workstation announced last July, will offer a standard interface for applications developers, known as the application binary interface. According to AT&T, that interface will allow users to run Unix applications interchangeably. AT&T officials said the SPARC-based chip will be used in a new computer to be introduced in 1989 but would not provide details.

AT&T may plan to use the SPARC chip in a new workstation to supersede some versions of the 3B minicomputer, according to George Colony, president of Cambridge, Mass.-based Forrester Research, Inc. "The primary significance is that AT&T has a new

See page 12

DCA tries hostile takeover of UB

continued from page 11

Ungermann made clear his disapproval of the merger plan, saying, "The proposal has been timed to take advantage of the unprecedented decline in the securities markets. The DCA proposal is clearly not in the best interests of our shareholders and customers."

DCA's action is a predictable one in light of current events. The stock market's precipitous decline over the last two weeks has, among other things, depressed stock prices below their actual value, making a number of companies ripe for takeover. In response to that threat, more than 200 companies recently initiated stock buyback plans, including four Bell operating companies, IBM, M/A-Com, Inc. and Atlantic Research Corp.

DCA's offer requires approval from the Ungermann-Bass board of directors, which will meet "in due course" to discuss the proposal, Ungermann-Bass spokeswoman Angela Mongillo said. While it is clear that Ralph Ungermann wishes to mount a defense, analysts noted the company has a large number of outstanding shares in the hands of institutional investors, who typically will opt to accept a takeover bid if it is likely to profit the shareholders. Ungermann-Bass will not comment on what measures it will take to ensure its independence.

DCA will not comment on its reasons for seeking control of Ungermann-Bass. But Doug Gold, a senior analyst with International Data Corp. (IDC) in Framingham, Mass., said, "DCA's Irmaboard market is evaporating as users move to other solutions. The logical next step for the company is local networking, and it is simply trying to buy market presence through Ungermann-Bass."

Presumably, the Ungermann-Bass acquisition would provide DCA with a complete line of local net products and a strong presence in the general purpose networking market where 10Net Communications does not participate.

"Ungermann-Bass is well-positioned in the broadband and token-ring arenas, while 10Net Communications markets Ethernet products," explained Rick Malone, a principal with the consulting firm Vertical Systems, Inc. in Dedham, Mass. "If DCA pulls this acquisition off, they could be a premier local networking company."

DCA has adopted an aggressive acquisition strategy in recent years that has contributed largely to an expanded product line and steady growth. In addition to the Fox acquisition, DCA since 1986 has scooped up Cohesive Networks, Inc., a T-1 multiplexer maker, and Microstuf, Inc., which markets personal computer communications software.

Ungermann-Bass markets, directly to users, terminal-to-host local network products that have some wide-area networking capabilities, such as T-1 bridges and X.25 gateways, according to Mongillo. Through its recently acquired subsidiary Industrial Networking,

AT&T, Sun set chip, Unix deal

continued from page 11

processor, which it badly needed," he said. "AT&T is admitting that its WE32000 chip in the 3B2 will be inadequate for the primary Unix market — engineering."

Sales of the 3B are far below AT&T's projections, according to published reports. AT&T would not comment on the reports.

AT&T's agreement with Sun also calls for creation of a joint development team that will merge the two major Unix versions, Berkeley 4.2 and AT&T's own Unix System V. According to sources at both companies, the new version will incorporate popular features of the Berkeley 4.2 version, which is known as a superior applications development environment.

It will also incorporate some features of SunOS, a variant of the Berkeley 4.2 system marketed by Sun. Those features include Sun's Network File System and X.11/News, a graphic user interface.

AT&T predicated its entire computer business on Unix, according to Colony, but implementations are "far too rigid" because they fail to incorporate extensions like the Berkeley versions. "This gives the industry a better chance of getting a standard, flexible Unix," he said. AT&T and Microsoft Corp. announced plans last February to merge Microsoft's Xenix version of Unix with System V to form a standard for the Intel 80386 chip. "What both agreements accomplish is the elimination of uncertainty in the Unix system market so there will be a single Unix standard for SPARC-based RISC computers, and a single Unix standard for Intel-based desktop computers," said AT&T spokeswoman Lenora Vesio.

Forrester Research's Colony forecast an increasingly close relationship between the two companies. "I believe this foreshadows a number of joint ventures between Sun and AT&T," he said.

BUILDING
THE NEW
LONDON
BRIDGE.

Inc., the company offers Manufacturing Automation Protocol-based networking products for the factory environment.

Ungermann-Bass has posted fairly strong growth since its inception in 1979. Its 1986 revenue was $110.9 million. For its third fiscal quarter ended Oct. 3, the company reported a 28% increase in revenue to $38.2 million and a 76% increase in earnings to $1.8 million, as compared with the similar quarter last year.

Mongillo stressed the company's ability to work as a systems integrator — providing the user with system design, installation and service, from start to finish — as a key to Ungermann-Bass' continued success. IDC's Gold said the company's strength lies in its provision of "soup-to-nuts" service, although it faces increasing competition from a larger pool of vendors seeking to sell the same service.

If Gold's evaluation is correct, with strong quarterly results and a solid product line, Ungermann-Bass has gained the momentum it needs to succeed as an independent player. And, according to Gold, it doesn't need DCA to achieve that.

Malone said the two companies could work well together but only if the merger is pushed through on friendly terms. Otherwise, he said, "If Ungermann-Bass is purchased by hostile means, its management won't remain with the company, and that would severely diminish its strength."

RBHCs prod Greene on restrictions

continued from page 11

and the National Consumers League also submitted comments to Greene asking that consumer and competitor safeguards against monopolistic abuses be enacted as part of the information service provision.

Nynex Corp. endorsed Greene's "vision of a sophisticated network infrastructure that will make it possible for all segments of the public to benefit from the information age," but urged the court not to "limit RBHC network transmission capabilities to only bare bones functions," according to Nynex's comments. "Such a decision would artificially limit the scope of services available to the public. The RBHCs should be allowed the opportunity to provide network capabilities that maximize" the benefits of information services, the company's comments stated.

Nynex wants Greene's list to go further and include such options as message store and forward, electronic mail, voice messaging and transaction support services.

Provision of these capabilities will allow the RBHCs to provide consumers with electronic gateways to a variety of information services, such as employment listings, restaurant and hotel guides, airline schedules, news updates, shopping catalogs and stock quotations, according to Nynex.

The U.S. Department of Justice concurred with the RBHCs in comments submitted to Greene. The Justice Department said the RBHCs should be given flexibility to provide functions needed by vendors and end users, such as information processing and storage.

The National Consumers League agreed that the RBHCs should be given flexibility to market different types of transmission services to address various types of user needs. The League said a customer using a dumb terminal will require different services than one using a personal computer, for example. To provide such capabilities, the RBHCs must be allowed to develop information storage and retrieval functions, the League said.

> Nynex Corp. endorsed Greene's "vision of a sophisticated network infrastructure."

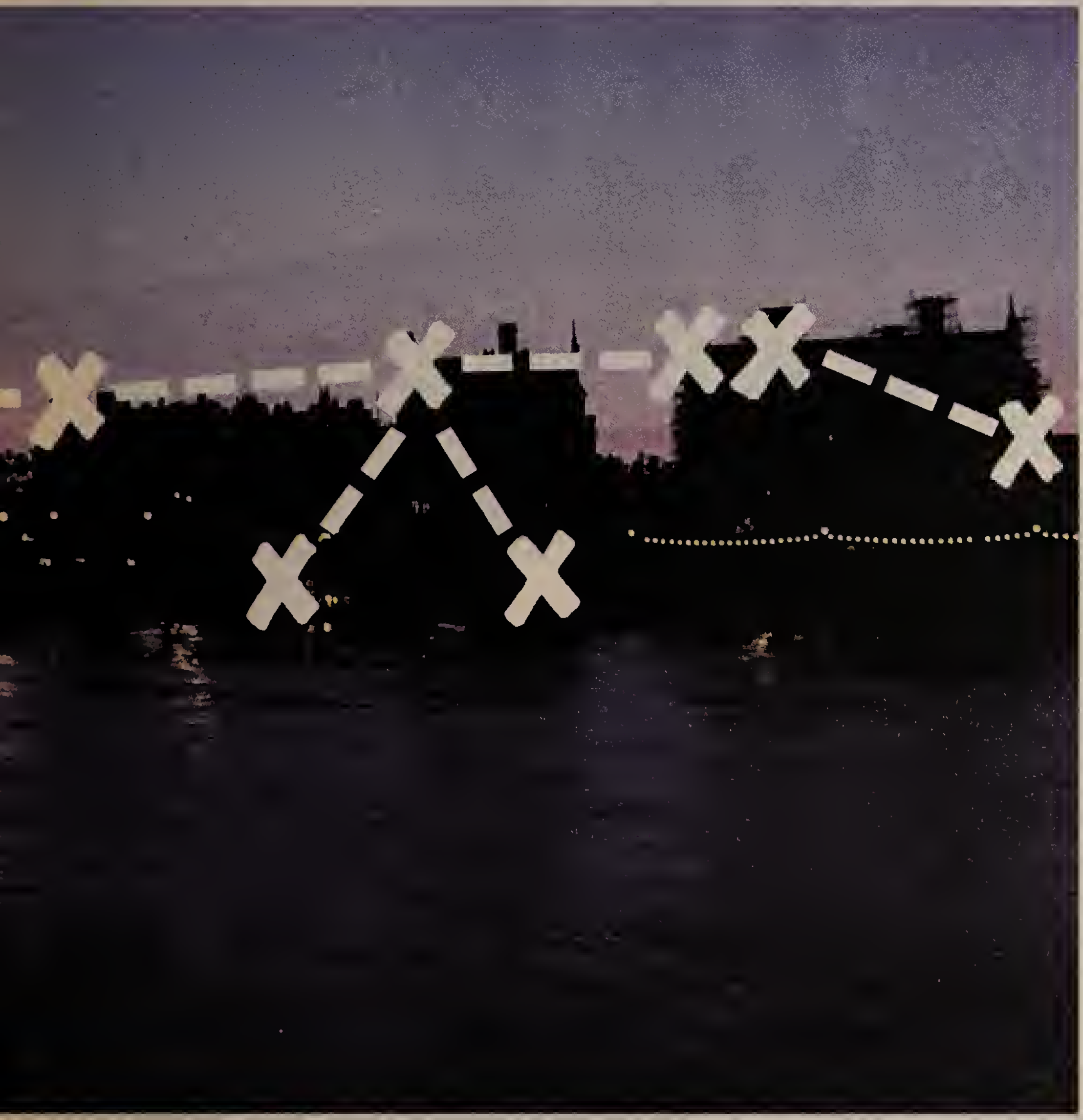
US West said the network functions outlined by Greene were necessary for ordinary telephone access to information services, but additional capabilities will be necessary to develop RBHC-based information service gateways.

Those features include instructions on how to use the gateway, information on the cost of using various information services, security features, capabilities to allow different types of computers to use RBHC transmission services without buying specialized software, messaging services, voice and text storage, and voice-to-text protocol translation.

US Sprint and Tymnet indicated that the competitive threat of RBHC entry into the nascent information service business is great and that steps should be taken to safeguard information providers from RBHC discrimination.

Clearly delineating the services the RBHCs can and cannot provide will prevent the RBHCs from gaining monopoly control in the information market, according to Tymnet and US Sprint.

After reviewing comments, Greene is expected to issue later this year an amendment to the Modified Final Judgment reflecting the recent decision.



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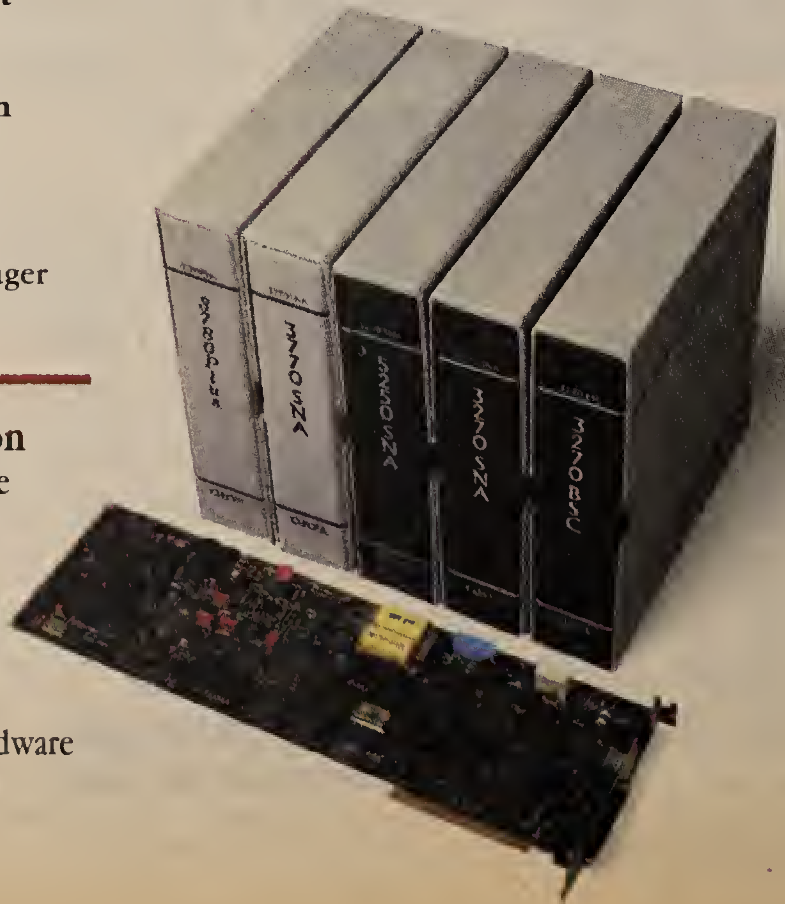

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TELECOM TRENDS

> “Information is as central to life in the last third of the 20th century as coal and steel were in an earlier day. It would invite real danger to permit that vital resource to be monopolized, either by government or private monopolists.
>
> **U.S. District Court Judge Harold Greene**
> At the recent Telecom '87 conference
> Geneva

CCMI/MCGRAW-HILL REPORT

Phone costs stabilize

Postdivestiture pattern of declining rates ends.

BY JOSH GONZE
Staff Writer

NEW YORK — Average prices of business telephone services leveled off in the third quarter of 1987, breaking a string of quarterly rate decreases begun immediately after the 1984 divestiture, according to a report issued last week by tariff tracker CCMI/McGraw-Hill.

CCMI's report, based on an index of prices charged for WATS, analog private-line and interstate toll services, said the average price of business telephone services had declined 20.8% between the time of divestiture in January 1985 and the end of 1987's second quarter. The index, comprising rates charged by AT&T, MCI Communications Corp. and US Sprint Communications Co. and weighted by market share, does not take into consideration digital or high-capacity services.

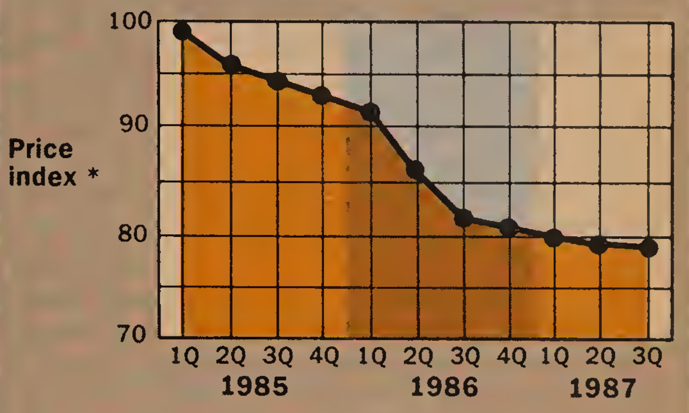
Other market analysts said the CCMI report is evidence that rates have reached a general price floor, which they been heading toward since competition began driving them down in 1985. “We're likely to have seen the last of the current round of price reductions,” said Gerry Mayfield, president of DMW Enterprises, a telecommunications consulting firm based in Stamford, Conn.

According to CCMI, rates for WATS and analog private lines were virtually unchanged from the previous quarter. CCMI's weighted average assigns the two services statistical weights of 60% and 35%, respectively, in terms of their importance to corporations and how these service rates affect overall corporate communications budgets.

Rates for interstate toll calls, used mainly by households and making up the leftover 5% of the weight in CCMI's averaging formula, fell by 5%, the report said. CCMI attributed that decline to cuts implemented by carriers to offset escalating subscriber line charges, a fixed

See page 16

Price index for long-distance services



Index is based on a weighted composite of WATS, analog private-line and toll services from the three major carriers: AT&T, MCI Communications Corp and US Sprint Communications Co.

* Based on a 1984 base index price of 100

SOURCE: CCMI/MCGRAW-HILL, RAMSEY, N.J.

CROSS TALK

BOB WALLACE

Voice switching: DEC's next frontier

Digital Equipment Corp.'s voice networking strategy — to work with multiple private branch exchange vendors to create integrated voice and data applications — may prove to be wiser, less time-greedy and more economical than buying a PBX maker, assimilating the company and bringing its switches into DEC's data networking framework.

DEC delineated its voice/data integrating strategy at the recent Telecom '87 conference in Geneva with the announcement of its Computer-Integrated Telephony (CIT) program.

The program was designed to encourage development of applications that combine the power of computers and telephone switches. These applications could, for example, enable an attendant receiving an incoming call to transfer the call simultaneously with a screen full of data extracted from a computer data base to a customer service representative.

Under CIT, both DEC and various PBX vendors are developing software that allows the two devices to communicate via a synchronous interface. DEC will develop software that will reside in the computer, and the switch vendor will write interface software for the PBX. A DEC spokesman said DEC computers will require different software modules, depending on which PBX is used.

The CIT program will enable DEC to bid with any CIT members to offer users one point of contact for voice switching and data networking gear. “Before CIT,” a DEC source said, “DEC was not involved with user bids that requested voice. We intend to work with PBX providers to address these bids.”

DEC sees voice switching as an entirely new frontier but said it will not create a separate sales and marketing contingent to sell integrated voice and data applications. Other vendors — such as IBM, with its Enterprise Marketing Program — support a SWAT team approach for large requests for proposal that require voice and data components.

Gail Daniels, a local network marketing manager for DEC, said the vendor will use its current national sales and support group to sell voice and data applications. “Specialized SWAT teams are not the answer,” she said. “They don't

See page 16

REGIONAL BELL HOLDING COMPANIES

FCC says equal access conversion over 75%

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The conversion to equal access is more than three quarters completed, according to the most recent figures released by the Federal Communications Commission.

The regional Bell holding companies have converted 77.4% of their network access lines for equal access, a regulatory requirement imposed on the RBHCs by the FCC. The rule requires the companies to provide all long-distance carriers the same level and quality of access to Bell operating company local exchange networks.

Equal access allows end users to place long-distance calls with any interexchange carrier by dialing 1, as opposed to lengthy access codes that may require dialing up to 14 extra digits. Prior to the equal access regime, AT&T was the only carrier that received premium ac-

See page 16

GOVERNMENT NETWORKS

AT&T fights GSA deals

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T filed a complaint with the General Services Administration's (GSA) Board of Contract Appeals last week, claiming it was not given a fair chance to compete for seven of 12 switch contracts recently awarded to regional Bell holding companies, even though AT&T won the five other bids.

The GSA awarded 12 contracts worth a total of $14.2 million earlier this month to AT&T, Bell Atlantic Corp., Pacific Bell Corp., Southern Bell Telephone and Telegraph Co. and US West Information Systems, Inc. The contracts were awarded as part of a program to upgrade switching services that are used in the existing Federal Telecommunications System (FTS) long-distance federal government network.

Of the 12 contracts awarded by the GSA, AT&T won five, worth a total of $4.9 million. Under those contracts, AT&T will upgrade FTS switching services in Los Angeles, Kansas City, St. Louis, Chicago and Detroit.

AT&T claimed in a statement issued last week that the GSA discriminated against it by “applying different evaluation standards on

See page 16

TELECOM TIDBITS

AT&T recently announced a new international service designed to be less expensive than international direct-dial long-distance and international private-line services for customers that average approximately six hours of international calling per day.

The service, which the firm dubbed International City Center Service (ICCS), will be provided initially between hubs in New York and London in cooperation with British Telecom International, Inc.

ICCS customers will access hubs here and abroad using private lines, but communications between hubs will be supported on AT&T facilities shared by many ICCS users. This process makes the service less expensive than private-line service.

Detailed in an Oct. 23 filing with the Federal Communications Commission, the service will offer point-to-point, two-way transmission of both voice and data.

The service will offer such features as abbreviated dialing, six-second billing intervals after the first minute, fast call set-up time and high-quality transmission.

Microtel, Ltd., a Boca Raton, Fla.-based provider of fiber-optic long-distance services, recently announced that its 1+ and WATS customers can now call anywhere in Canada.

Microtel serves 63,000 customers and offers a variety of fiber-optic telecommunications services, including 1+ dialing, WATS and private-line services capable of transmitting data, voice and video.

Southern New England Telecommunications (SNET) recently announced a multiyear agreement to provide digital switching and transmission services to General Electric Co. at its headquarters and other locations in Connecticut.

The agreement complements GE's contract with AT&T for the design and installation of a nationwide, private telecommunications network called General Electric Telecommunications Network (GETN). GETN will upgrade GE's existing Dial-Comm network, creating one of the largest private digital networks in the U.S., according to a SNET spokesman.

Equal access conversion

continued from page 15

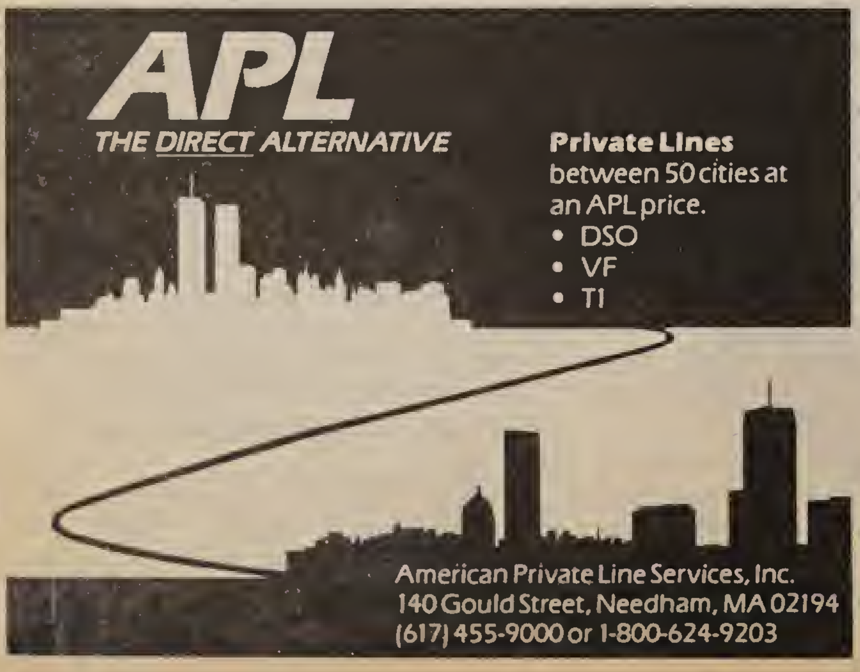
cess to BOC net facilities.

Bell Atlantic Corp. has converted the highest percentage of its lines at 85.3%, while Nynex Corp. had the lowest conversion percentage at 63.6%, according to an October FCC report on conversions.

According to the report, which is based on information supplied by the RBHCs, as of June 30, Ameritech had converted 82.7% of its central offices to equal access; BellSouth Corp. had converted 76.7%; Pacific Telesis Group had converted 73.7%; Southwestern Bell Corp. had converted 82.1%; and US West, Inc. had converted 77.2%.

By the end of 1987, Ameritech plans to have 87.6% of its central offices converted to equal access; Bell Atlantic plans 90.9%; BellSouth plans 86.5%; Nynex plans 68.8%; Pacific Telesis plans 93.2%; Southwestern Bell plans 85%; and US West plans 80.4%.

Total RBHC conversions by the end of 1987 will be 84.8%, according to the FCC report.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DEC's next frontier

continued from page 15

work in the long run. Although we need to learn about the telecommunications manager, we won't create a single force to sell voice and data systems to users," she explained.

In a joint bid situation, the switch vendor will address the voice networking issues, and DEC will focus its efforts on the computer systems needs.

Daniels said DEC has been discussing the CIT program with some of its customers for close to a year, but she would not say how many it had approached nor would she divulge their identities.

"We have been talking to the telecommunications decision makers in our accounts," according to Daniels. "It is a new language for us."

DEC has teamed with Northern Telecom, Inc., a CIT member, to submit joint proposals to users, but Daniels would not say whether the team won any contracts.

Daniels said the gap between a user's telecommunications department and its data processing/MIS group is narrowing. "The line is not so clearly drawn anymore," Daniels said. She added that this will make selling voice and data systems to users easier in some cases.

How successful DEC is with its CIT program depends largely on how many switch makers join the effort and to what extent they participate in the program. DEC said NEC America, Inc., Ericsson, Phillips Telecommunications and Data Systems, The Plessey Company, plc and Siemens AG will work with DEC to develop the software and hardware needed to facilitate the use of integrated voice/data applications. Other PBX makers, such as AT&T, Rolm Corp. and Intecom, Inc., are standing on the sidelines.

AT&T fights GSA deals

continued from page 15

AT&T's bids than were used on the RBHCs' bids." AT&T said it lost the chance to compete meaningfully for seven of the 12 switching contracts up for bid.

The GSA declined to comment on AT&T's complaint.

A Bell Atlantic spokesman said, "We felt the GSA used the appropriate procedures for reviewing the bids and feel we won the contracts fairly and squarely."

Bell Atlantic was awarded a $4.5 million contract to upgrade FTS switching services in Washington, D.C. and Philadelphia. Pacific Bell won a $326,000 contract to provide FTS switching services in San Francisco; Southern Bell, $2.1 million for service in Atlanta and New Orleans; and US West Information Systems, $2.4 million for service in Minneapolis and Seattle.

The objective of this program is to upgrade FTS switching capabilities in high-traffic locations by replacing the current tariffed services now provided by AT&T with more advanced services, according to a GSA spokesperson.

The upgrade is expected to save the federal government an estimated $7 million, according to GSA Commissioner Frank Carr, of the Information Resources Management Service.

The Board of Appeals has 10 days to hold a prehearing to review arguments by all parties involved.

At that time, the board will decide whether the contracts should be suspended pending an investigation, according to a GSA spokeswoman.

Phone costs stabilize

continued from page 15

monthly bill mandated by the Federal Communications Commission.

Rates may fall slightly in 1988, but, except for digital services, the postdivestiture pattern of declining average rates is over, analysts said.

"We're in a period now where we're talking more about fine-tuning rates so that you won't see these radical changes," said CCMI's George David, vice-president of product management. "Over time, the carriers have brought the services in line better with the cost of providing them," David said, "but in the next year, I think we'll still see a little bit of a decline."

Though average rates may have stabilized, particular types of services may still fall in price for some time. "Each service is driven by its own set of industry forces," said Victor Krueger, senior industry analyst at San Jose, Calif.-based Dataquest, Inc. "InWATS for example, which previously was available only from AT&T, now has a number of competitors entering the market."

Average rates may also further decrease, analysts agreed, as carriers finish implemention of highly efficient fiber-optic networks.

"Rates will fall as more of the fiber-optic circuits are implemented. They're installing plant with lower inherent cost," DMW's Mayfield said. The older technology's imbedded cost per circuit mile is about $7, while fiber's cost is $1 to $2 per circuit mile, according to Mayfield.

Dataquest's Krueger agreed, saying, "Long-distance transmission capacity will potentially be in oversupply. That would have a depressing impact on long-distance rates."

A move away from the rate-of-return regulation the FCC currently imposes on AT&T could also help lower telecommunications rates by encouraging lower costs. The price caps proposed as an alternative to rate-of-return regulation would set price ceilings for AT&T services but allow the company to keep any profits instead of stipulating a maximum rate of return calculated as a percentage of the service revenue.

"The big questions right now are: How will the FCC choose to regulate AT&T? Will they stick with rate-of-return-based regulation, or will they go to price caps? If they go to price caps, it's less sure that the subscriber line charge increases will translate into lower rates," CCMI's David said.

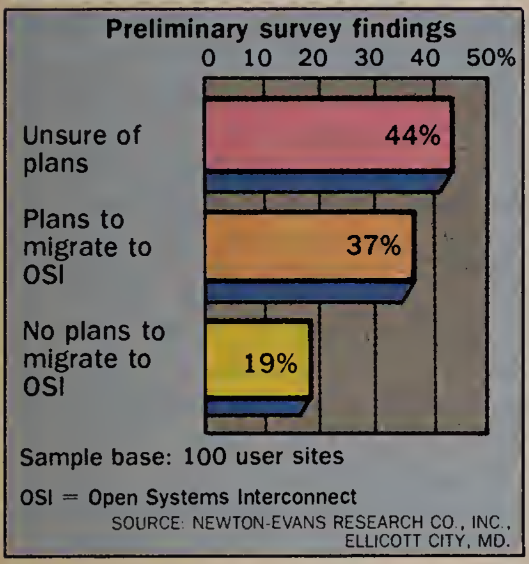
Rates for high-capacity circuits, such as T-1 lines, promise to fall even more as the competition heats up in that market. David pointed to vendor consortia such as the National Telecommunications Network as a source for such rate competition. In addition, he said, "AT&T has a rate filing right now that will introduce a variety of discount plans aimed primarily at retaining some T-1 customers that they're probably losing to some of these regional fiber carriers that are offering extremely attractive rates on long-term plans."

DATA DELIVERY/ NET MANAGEMENT

Infotron chief named

James C. Castle has been elected president, chief executive officer and a member of the board of directors of Infotron Systems Corp., a communications vendor in Cherry Hill, N.J. Since 1984, Castle had served as president of Thyssen-Bornemisza Group. Former Infotron President James C. Hahn remains as vice-chairman of the board of directors.

Users' plans for TCP/IP networks



Sample base: 100 user sites

OSI = Open Systems Interconnect

SOURCE: NEWTON-EVANS RESEARCH CO., INC., ELLICOTT CITY, MD.

▶ *HIGH-SPEED TRANSFERS*

Searle picks Fastpath link

Intel unit permits high-speed IBM-to-VAX file transfers.

BY JOSH GONZE
Staff Writer

SKOKIE, Ill. — A large pharmaceuticals manufacturer here recently installed an Intel Corp. channel extension unit to connect its IBM mainframe to a cluster of VAX minicomputers, thus enabling users to perform large file transfers at high speed.

G.D. Searle & Co. began using Intel's 9750 Fastpath control unit last spring to provide a reliable way for researchers doing statistical analysis on the company's IBM 4361 mainframe to access and transfer data collected on the general purpose VAXcluster. In addition, VAX users occasionally require the IBM machine's superior processing power.

The Fastpath unit replaced an IBM Model 7170 direct access control unit (DACU), a hybrid link IBM does not support with on-site service. After a power failure in January knocked the DACU out for six weeks, taking with it the IBM-to-VAX communications link, Searle's systems managers began shopping for a replacement.

"When we need it, we absolutely have to have it. We're very deadline-oriented," explained Michael Thran, supervisor of systems and programming at Searle. "We just could not afford that kind of delay."

Searle's systems managers evaluated two products for the task: the VAX-resident Interlink, from Interlink Computer Sciences, Inc., and Intel's Fastpath unit, which operated under an upgraded version of the Flexlink software already running on the DACU.

Fastpath was selected because it was less expensive than Interlink and mainly IBM-resident, which Thran said was more appropriate for Searle's applications. Interlink is better suited for VAX applications drawing off an IBM processor, Thran said.

The Fastpath processor is cable-attached to an I/O channel on the 4361 mainframe, which uses IBM's VM operating system. A fiber-optic cable extends to a DRW-11 interface board on a VAX 785, with Canoga-Perkins Model 4020 fiber-optic bus interfaces serving as optical converters. Other than the 785, which serves as a communications controller, the VAXcluster contains four VAX 8650s and several MicroVAXes. It is located in the same building about 60 yards away, and it supports more than 600 end users.

While file transfer in text and binary formats is the Fastpath's

See page 18

▶ *ELECTRONIC MAIL*

Orion link for SNADS, non-IBM systems bows

BY MARY PETROSKY
West Coast Correspondent

BERKELEY, Calif. — Orion Network Systems, Inc. last week introduced a new software product that allows for the exchange of electronic mail and documents between IBM's Systems Network Architecture Distribution Services (SNADS) and non-IBM systems.

Aimed at large corporate users and computer vendors, Orion's SNADS Facility simplifies the task of tying into a SNADS environment, according to Jim Mullen, vice-president of sales and marketing for Orion. SNADS, based on IBM's LU 6.2 peer-to-peer communications protocols, provides store-and-forward capabilities for messages, files and other bit streams.

Orion's SNADS Facility works in conjunction with an implementation of LU 6.2 to enable non-IBM computers to send and receive documents from any IBM SNADS system, including System/370 mainframes and the System/38 and System/36 minicomputers. A wide range of non-IBM mainframes and minicomputers can use Orion's SNADS Facility, which is written in C language, Mullen said.

"SNADS is IBM's answer to X.400," Mullen said. "It's IBM's standard way of moving documents or bit streams around." The SNADS Facility includes an application programming interface for calling a series of subroutines that correspond to SNADS verbs. These subroutines can be used to distribute and receive documents and provide transaction status information, Mullen said.

The SNADS Facility also includes an interface to directory services so that proprietary directory management applications can be used on non-IBM systems. In addition, any computer running the facility will be able to act as an intermediary for messages between other nodes on a SNADS network.

See page 18

DATA DIALOGUE
ROSHAN LAL SHARMA

Shattering the myths of net design

Designing an integrated private network is no small feat. In fact, network design is one of many tasks related to the more complex discipline of network planning.

Although network planning was always a complex process, desk-top computer technology has matured to a level at which one can now simplify most of the tasks related to network design. But the field is riddled with many myths. In this column, we will attempt to debunk eight of them.

Myth No. 1: A detailed printout describing a network and its costs will enable a user to determine how to design the network.

Nothing can be further from the truth. Computer printouts are useless during the early stages of network design and should be used only for documenting the final solution.

Our minds grasp more from pictures than from the printed word. When designing a network, a user should concentrate on graphic displays and use few network cost summaries.

Graphics should depict the nodes on the network, geographical areas so links can be clearly seen and central sites that may qualify as a location for a concentrator.

By illustrating network topologies and showing nodal interconnections and network hierarchies, a user can find errors in a data base and investigate ways to improve the network.

The easiest way to accomplish this task is through what-if analysis.

Myth No. 2: Any network design package can handle all user requirements.

This author has never been able to design a private network without making extensive changes to the network design software. Such modifications arise from specific needs of the user, such as constraints of the network topology, transmission and switching requirements or traffic routing. Whereas a voice network may support only two topologies (star and mesh), a data network may require a more complicated design, such as star, directed link or multidrop and mesh.

Furthermore, the need to compute response times for all network architectures creates many constraints. Each network architecture — such as IBM's Systems Network Architecture and Token-Ring Network, Digital Equipment Corp.'s DECnet, and Ethernet — requires special analytical tools to determine response time.

See page 18

Sharma is president of Telecom Network Science, a consulting and software firm in Dallas.

▶ *INTELLIGENT INFORMATION SYSTEMS, INC.*

IIS IBM-compatible remote controller bows

IS-374R sports 9.6K, 64K bit/sec speeds.

BY PAUL KORZENIOWSKI
Senior Editor

HACKENSACK, N.J. — Intelligent Information Systems, Inc. (IIS) recently expanded its line of IBM-compatible cluster controllers with a unit designed for remote communications.

IIS' IS-374R supports up to 32 IBM 3270 series terminals and printers and communicates with central IBM host systems at speeds up to 9.6K bit/sec using Binary Synchronous Communications and 64K bit/sec using Synchronous Data Link Control protocols.

The controller features ½M byte of random access memory and a built-in disk drive. Users can download configuration data — information about peripherals supported by the controller — from a central site.

The product connects up to eight ASCII printers through an RS-232 asynchronous adapter and can support up to eight IBM 3299 multiplexers, enabling terminals to be supported at distances up to 1,000 feet. The 3299 also enables customers to use telephone-type wire to support terminals instead of the usual coaxial cable. The IS-374R's line-monitoring feature automatically examines the health of all communications links.

The company pledged to enhance the controller so users would be able to access two IBM hosts simultaneously, a feature IBM controllers now lack. Other promised enhancements include support for IBM's Token-Ring Network and a connection between IBM hosts and Digital Equipment Corp. VAX computers. The enhancements are scheduled to be available in six months, according to Naftali Oron, president of IIS.

IIS was formed in 1984 and is an independent subsidiary of Intelligent Information Systems, Ltd., an Israel-based manufacturer of IBM 3270 products. The company says it has 65% of Israel's IBM 3270 business.

The price for the IS-374R ranges between $3,000 and $9,000, which IIS says is 30% less than that of comparable IBM products.

Shattering myths of net design

continued from page 17

Such analysis is a prerequisite for obtaining the upper load limits on network trunks tuned to create a cost-effective network that satisfies given response time constraints.

Therefore, it is very important to understand each network architecture instead of using one network design tool for all jobs.

Most of the commercially available design packages can handle only a homogeneous network architecture. To work effectively, a package must be capable of handling several transmission media. Only then can the tool help a user design an integrated voice and data network.

Myth No. 3: Only mainframes are capable of designing integrated voice/data networks.

Many desktop computers such as Apple Computer, Inc.'s Macintosh Plus and the IBM Personal Computer line bring network design tools to the desk. With these new computers, the designer can make a large number of what-if-type investigations on a single day.

Even though a mainframe can perform all the computations in a few seconds, productivity can be hampered by the fact that it often takes several hours or an entire day before printouts are delivered.

Myth No. 4: Only an expert system is useful for the total network design process.

Expert systems are generally most useful in an environment with a huge relational data base. An expert system can take a designer's experience and store that information in a data base, which less experienced technicians can use.

Expert systems can be effectively used in such areas as network management. However, the network design process is entirely algorithmic in nature, not a matter of trial and error. Expert systems are the wrong approach for network design.

Myth No. 5: Each network design process is equivalent to simply loading the program and then pressing the RUN button.

The reality is quite different. Network designers invoke many what-if solutions until their requirements are met. The process involves a wide variety of options and approaches rather than a simple, straightforward solution.

Myth No. 6: A network design package is useless unless it employs the latest and most complete tariff data.

Experience shows that one can make very simple models of most tariffs (for example, voice grade, digital data services, virtual network services, 800-services, bulk fiber optics, digital microwave and so on) and use those to develop accurate network topologies during the early stages of the design cycle.

Expert systems are wrong for network design.

When the most valid solution is found, it is an easy process to compute the total network cost accurately using either subroutines based on detailed tariff data or any commercially available line pricing packages. Such an approach makes the design process fast and interactive.

Myth No. 7: Network design tools are needed only during the planning process.

Experience shows that network design tools are also critical during the period just following cutover and at regular intervals after that in order to keep the network optimized in the face of ever-changing tariffs and traffic patterns.

Myth No. 8: Network simulations are essential for designing an optimum network.

Some commercial packages are based on simulation techniques for designing optimum voice networks or data networks with precisely defined response time constraints. Since analytical solutions are available for most network architectures, the use of simulations is unwarranted.

Simulations tend to cost a good deal of money because mainframes are generally needed to process statistical information. To illustrate, end-to-end response times can be obtained in terms of the media characteristics and media loading, message lengths and traffic intensities for most network architectures such as a Token-Ring, Ethernet or conventional multidrop networks.

Approximate but applicable analytical solutions are generally adequate to investigate all topological solutions using desktop computers. Some solutions based on computer simulations can actually yield incorrect results if based on incorrect design assumptions.

Orion SNADS, non-IBM link

continued from page 17

"We respond completely like another SNADS node," Mullen said.

A company such as a bank could use Orion's SNADS Facility for any store-and-forward applications, such as connecting a local (non-IBM) electronic mail system into a SNADS network, Mullen said. SNADS could also be used to download software from a computer to a controller, Mullen said.

In addition, he said he believes IBM will use SNADS to move network management data around a network.

The SNADS Facility is available immediately either as a stand-alone product or as an option to Orion's sna62 Peer Communications Facility, which implements both LU 6.2 and Node Type 2.1. The SNADS Facility is being offered on a license basis for source code beginning at $75,000, not including monthly maintenance charges, Mullen said.

Searle picks Fastpath link

continued from page 17

primary application at Searle, end users there also utilize its support for terminal emulation and remote editing. IBM 3180 terminals appear as Digital Equipment Corp. VT220 and VT240 terminals and use commands on pop-up menus. VAX users don't have pop-up menus and must key in line commands to set up access to the 4361.

"My training now consists of taking a couple pages out of the manual and saying, 'Here you go.' They're more than happy to use it," Thran said.

While Thran said he has not measured Fastpath's speed to test Intel's claim of 3M byte/sec, he said it is definitely faster than the DACU. "The only thing that slows it down is either the IBM or VAX is too busy to take it. It's never been the Intel that slowed it down." Capabilities that Thran would like to see added to the Fastpath unit include direct support for printers and tape drives.

While Thran said he has not measured Fastpath's speed, he said it is definitely faster than the DACU. "The only thing that slows it down is the IBM or VAX."

The Fastpath/Flexlink system is designed to transmit data to any IBM 370-architecture mainframe, which includes the 43XX and 30XX class machines. The IBM-to-DEC version, first announced about a year ago, can be configured to support up to four additional concurrent connections, according to Intel.

Other options

Instead of a VAX, the mainframe could be linked to an Ethernet, token-bus or token-ring network or to special peripherals such as optical disks or graphics displays. A version of Fastpath designed to link an IBM 370 mainframe with a local network running under the Manufacturing Automation Protocol has been implemented at a California aerospace company. According to Intel, the Fastpath/Flexlink combination can also serve as a bridge between an IBM Systems Network Architecture-based network and a network based on DEC's DECnet architecture.

Intel announced last summer installation of Fastpath products at several additional user sites, including Eastman Kodak Co., McDonnell Douglas Corp., Federal Home Loan Banks of Seattle and San Francisco and OKI Semiconductor.

The Fastpath channel-attached control unit is manufactured by a division of Intel called the Systems Interconnect Operation. The company has priced the product, packaged with Flexlink software, at $80,000 to $130,000, depending on processors being connected.

LOCAL NETWORKING

> “In the ’80s and ’90s, we’re striving for a balance between the individual’s and the institution’s needs. Networking will provide the tools that facilitate this.
>
> **Jan Lewis**
> President
> Lewis Research Corp.
> Palo Alto, Calif.

LAN STRATEGIES

IBM plugs S/36 as server

Low-cost version of mini has direct Token-Ring connection.

BY PAULA MUSICH
Senior Editor

RYE BROOK, N.Y. — IBM recently strengthened the position of its System/36 minicomputer as a network server for Token-Ring networks supporting IBM Personal Computers with the addition of a new, lower cost version of the departmental processor.

The System/36 5363 System Unit, introduced in conjunction with network management products two weeks ago (“IBM salvo adds to NetView’s stature,” *NW,* Oct. 26), for the first time includes a direct Token-Ring connection that substantially reduces the cost and hardware requirements for local network connections.

“As we look at the market for LAN servers, most of the competitive servers are priced at less than $30,000,” said John Erickson, manager of product planning for the System/36. “The 5363 in this environment is typically a $15,000 to $20,000 system, whereas the [System/36 model] 5362 is $35,000 and up. What the 5363 brings now is the function and the price/performance to be competitive.”

The new System/36 can support up to 100 Personal Computers and Personal System/2s on two individual Token-Ring Networks, according to IBM. Unlike existing System/36s, which support Token-Ring links through a Personal Computer AT serving as a communications processor, the new processor supports network links directly.

The connection consists of an AT motherboard and modified personal computer Token-Ring adapter, which are installed at the factory or by IBM field technicians. This approach lowers the cost of the System/36 Token-Ring connection by $3,000 to $4,000, according to Erickson.

Software support of Personal Computers is accomplished using the existing PC Support/36 program, which enables System/36 files to be transferred to the Personal Computer in a number of different Personal Computer file types, including ASCII text files, DIF files and DOS random and BASIC files.

The program also allows Person-

See page 20

LANMARKS
ERIC KILLORIN

LattisNet makes the grade in Novell benchmark tests

Novell recently installed a 500-node local network using SynOptics Communications, Inc.’s LattisNet Unshielded Twisted Pair (UTP) and found, in a series of benchmark tests, that the Ethernet-over-telephone-wire technology produced little or no degradation in throughput when compared with an identically configured thin Ethernet network.

Here’s what Novell concluded:

- The first test measured single-station throughput of an IBM Personal Computer AT to a Novell 286A file server running System Fault Tolerant NetWare Level II, Version 2.1. Both Personal Computer and server were configured with Novell NE-1000 Ethernet adapters. Provo, Utah-based Novell’s Perform2 test program ran on the Personal Computer AT and was set up to read 1,000 overlaid 4K-byte packets from the server. For the LattisNet configuration, the Personal Computer AT was located 250 feet from the server; a comparison configuration was set up with RG-58U coaxial cable, with the Personal Computer AT located just 20 feet from the server.

LattisNet scored a throughput of 173.5K byte/sec, while thin Ethernet came in at 168.2K byte/sec. Although Novell was quick to point out that this difference could be due to experimental error, LattisNet’s performance showed no degradation whatsoever. Novell also found that a seven-node test network revealed little degradation in network throughput.

- The second test looked exclusively at LattisNet and measured two data integrity variables: lost packets and erroneous packets. Six Personal Computers were attached to the Novell server via phone cabling and LattisNet hardware. Node distances ranged from 20 feet to several hundred feet.

Over a 20-hour period, 100 million 576K-byte packets were dispatched, and none was lost. The bad packet test measured file server use, such as continuous file copying and comparing, during a 2½-hour period. During this time, more than 92,400 packets were received by the file server, none of which was bad.

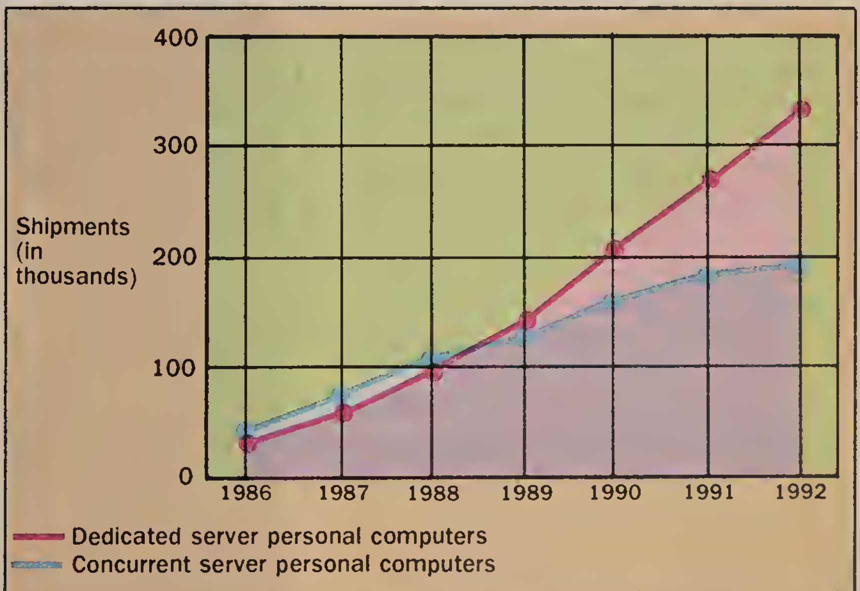
These results bode well for SynOptics and its product but don’t tell enough about LattisNet’s performance in large net installations, SynOptics’ target market. Perhaps Novell could use its 500-node LattisNet as a guinea pig for some testing on a larger scale.

Since Mountain View, Calif.-based SynOptics will quote only an average connection price, a component-by-component price evaluation would allow price-per-connection analyses to be weighed against performance. This would be useful to local network planners conscious of the total picture.

The tests discussed here were done quite informally, it seems, so more formal benchmarks may be forthcoming. Perhaps we’ll see another version of the infamous LAN Shootout that compared Synoptics’ LattisNet UTP, IBM’s Cabling System and AT&T’s Premises Distribution System.

Killorin is the publisher of “Netline,” a newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

Local net server sales predictions for 1986 through 1992



SOURCE: FUTURE COMPUTING, INC., DALLAS

NETWORKED APPLICATIONS

Apollo tool aids in software sharing

BY PAULA MUSICH
Senior Editor

CHELMSFORD, Mass. — Apollo Computer, Inc. recently took a stab at solving the thorny issue of software licensing for local network environments by introducing the Network License Server (NLS), software that allows a set number of users to access an application concurrently anywhere in a network.

NLS takes the middle ground between single-CPU licensing and site licensing by implementing the concept of concurrent usage licensing.

Using the concept, customers would restrict access to certain applications by buying programs from software developers that license and support NLS application “locks.” Users can access these applications using “license keys” bought from the software supplier. The number of keys required is determined by how many users need to access the application at any one time

NLS runs in Apollo Network Computing System envi-

See page 20

IBM plugs S/36 as server

continued from page 19

al Computer users to share System/36 printers, provides System/36 disk storage and provides a single System/36 menu interface to the end user for Personal Computer and System/36 functions.

Erickson maintained that the integration of Personal Computers with the System/36 and its applications, which he said is transparent, provides IBM with a competitive advantage over local network server vendors. Other vendors require that users execute separate upload and download functions to access the System/36.

"PCS/36 gives users an integrated menu of functions they can execute, and from the end user's perspective, whether it's executed on the System/36 or the PC, it's transparent," he said.

Industry consultant John Pickens, director of communications architecture for Communications Solutions, Inc., agreed. "It goes beyond being a file server. PCs and [System] 36s will seamlessly work together regardless of where the actual functions are located."

Another competitive advantage promised with IBM's approach is the connectivity the System/36 can provide between Personal Computers and other IBM hosts. "It [PSC/36] gives PC users full access to all System/36 application programs as well as IBM-supplied 36 office functions — document distribution and so on — and also connectivity through the System/36 upline to IBM mainframes," Erickson said.

Industry observer Frank Dzubeck, president of Communications Network Architects, Inc., a network consulting firm based in Washington, D.C., agreed that the 5363 and PCS/36 software provide connectivity to other IBM hosts. Dzubeck said he believes this host connectivity is provided by Advanced Program-to-Program Networking (APPN) software. However, he said the new machine provides too little memory for applications processing and very limited capabilities.

"It's almost like a virtual disk machine [for storing MS-DOS files] and a gateway out to an APPN network," Dzubeck said. "The 5363's 1M-byte memory limit is nothing. It doesn't leave much for application code."

Pickens' reservations about the 5363 as a network server go beyond functions to the openness of IBM's approach. Although Personal Computer network server vendors have taken steps to open their networking software to application developers, IBM's approach is closed and proprietary, he said.

"There is no intention from IBM to open those up, so other vendors can't work with this," Pickens said.

Apollo tool aids software sharing

continued from page 19

ronments, a set of distributed network computing products that allow users to share the processing power of multiple computers in an Ethernet or Apollo token-ring net.

To support NLS, network file servers — initially Apollo workstations — are configured with NLS software and a set number of application licenses. NLS will lock out any users that try to access the application beyond the set limit.

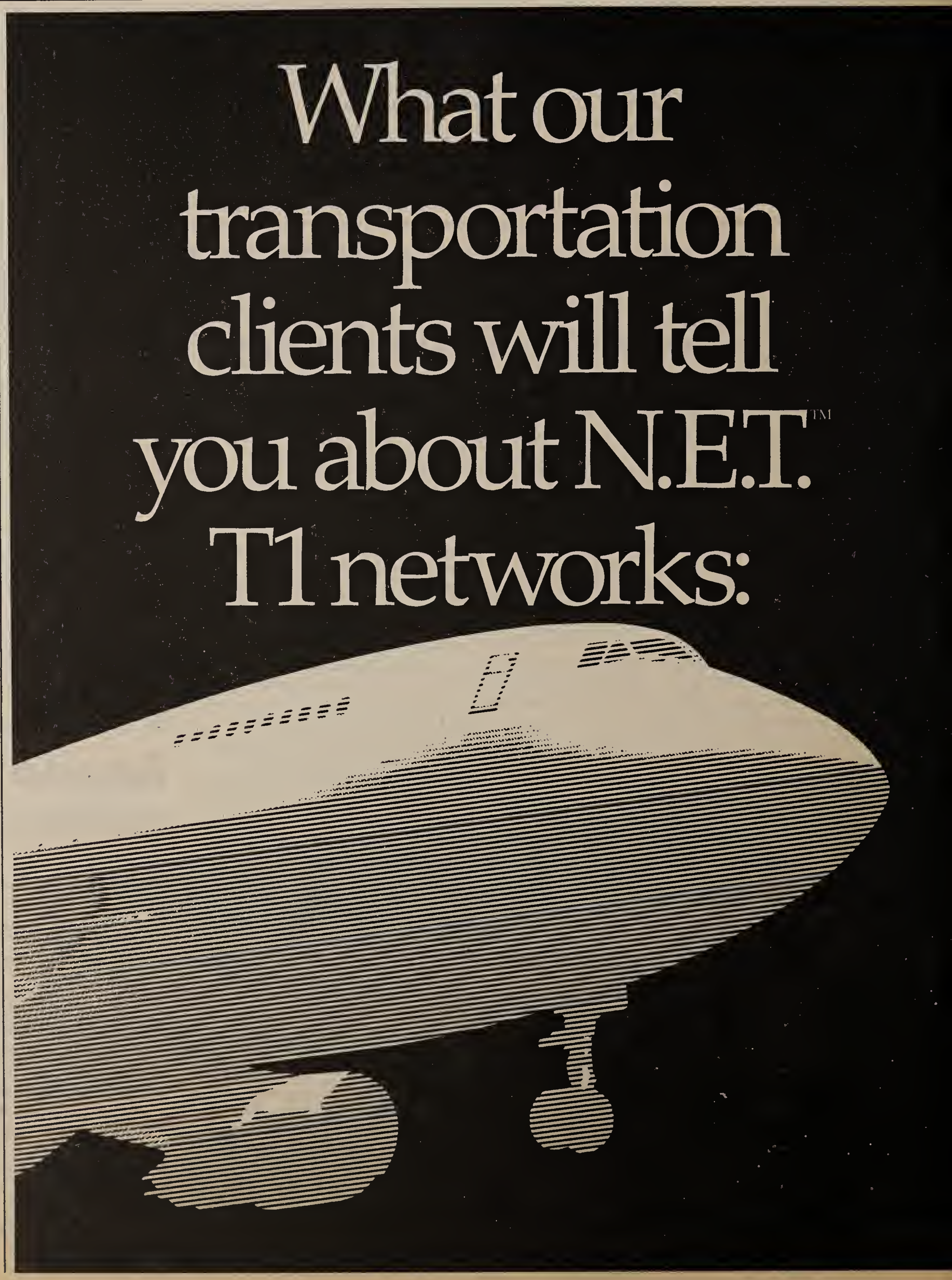
NLS manages the number of software license keys a customer has purchased for a certain package and dispenses only the number of keys purchased from the software supplier. Copies of the application are installed on the end user's computer but remain inaccessible without a key issued from the NLS program in the server.

NLS works in conjunction with Apollo's Network Computing System (NCS) to distribute application keys across the network so that NLS doesn't have to run in the same system as the application. Users license NLS software from Apollo and a rack of "key-hooks" to store license keys. Apollo is now offering a 50-hook license server for $4,000. End-user keys are purchased from the application developer.

Apollo is working with some 40 third-party software suppliers to develop NLS applications. Although Apollo would not identify the developers, it is targeting electronic design automation, mechanical computer-aided design and artificial intelligence applications.

NLS will initially be available on Apollo workstations by March 1988 and later on Digital Equipment Corp. VAX processors running the VMS and Ultrix operating systems. Apollo will also support NLS on Sun Microsystems, Inc. workstations.

Apollo also announced NCS support for MS-DOS, Unix System V, DEC Ultrix and SunOS operating systems. The new ports allow IBM Personal Computers, Cray Research, Inc. supercomputers, Sun Microsystems workstations and DEC VAX/Ultrix minicomputers to communicate in an NCS network.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▶ *NETWORK SOFTWARE*

IBM won't back Novell, Microsoft PS/2 tools

BY PAUL KORZENIOWSKI
Senior Editor

The software side of IBM's local network strategy for the Personal System/2 began crystallizing early last month when IBM declared it would not license Microsoft Corp.'s LAN Manager or a planned alternative from Novell, Inc., choosing instead to develop its own competitive product.

Microsoft has been trying to position LAN Manager as a de facto standard for Personal System/2 networks since it was unveiled April 2 and had hoped IBM would back the product. LAN Manager is the network operating system Microsoft developed to complement Operating System/2 (OS/2), the operating system IBM plans to use on its Personal System/2 line. One company, 3Com Corp., said it will support LAN Manager.

Analysts speculate that IBM shied away from LAN Manager in favor of a series of proprietary operating system extensions for OS/2, dubbed OS/2 Extended Edition. The extensions, which were unveiled when the Personal System/2 was announced, include data base functions and a set of communications capabilities.

The communications portion will enable customers to use a variety of network options to support the Personal System/2, including IBM's Token-Ring or an IBM 3174 terminal control unit. IBM said it will announce the delivery date for OS/2 Extended Edition in the fourth quarter of this year.

Analysts said IBM is using the OS/2 Extended Edition to differentiate its microcomputer from plug-compatible microcomputers, which have eroded IBM's share of the market. Dale Kutnick, executive vice-president at Gartner Group, Inc., a Stamford, Conn., market research firm, said the microcomputer market has become a commodity market, in which price rather than function distinguishes products. One of the factors contributing to the success of plug-compatible microcomputer manufacturers is their ability to license the MS-DOS operating system from Microsoft and run software designed for the IBM product. OS/2 Extended Edition contains proprietary IBM products, which will probably not be licensed to other vendors.

But David Terrie, an independent consultant and editor of "Patricia Seybold's Network Monitor" newsletter, said other vendors will be able to duplicate IBM capabilities. "IBM wants customers to believe that there will be an IBM way to support local network applications and another way of supporting them, and that the two won't be compatible," he said. "To follow such a course would be out-and-out suicide for IBM."

IBM does not control microcomputer standards, Terrie said. After years of being able to choose any vendor's hardware and software, customers would balk at being locked into an IBM-only approach.

Terrie also said IBM would have to make parts of OS/2 Extended Edition open so software developers could write applications for it. He predicted IBM would develop an application program interface (API) — which software developers use to write application programs — similar to the LAN Manager's API and that software applications would be able to run under either product.

IBM has followed a similar strategy in the past. Instead of licensing MS-NET — the Microsoft network operating system for MS-DOS — IBM developed the IBM PC LAN Program. Yet the two products can run the same applications.

According to Kutnick, OS/2 was specifically designed for local network applications, and it would be very difficult for IBM to circumvent the LAN Manager entirely.

But Stephen Randesi, chairman of Gen2 Ventures, a consulting firm in San Jose, Calif., disagreed. He said OS/2 Extended Edition promises functions that the LAN Manager will be hard-pressed to duplicate. "Companies want to do more than just tie their personal computers together," he said. "The personal computers should be able to access the corporate mainframe as well." The Extended Edition promises such functionality; the LAN Manager does not.

IBM could also develop new applications that tightly couple the OS/2 Extended Edition's data base and communications capabilities, according to Randesi. Other vendors will then have to match the breadth of IBM's offerings.

Microsoft, for example, would have to develop a data base product and communications interfaces for media other than local networks. ☑

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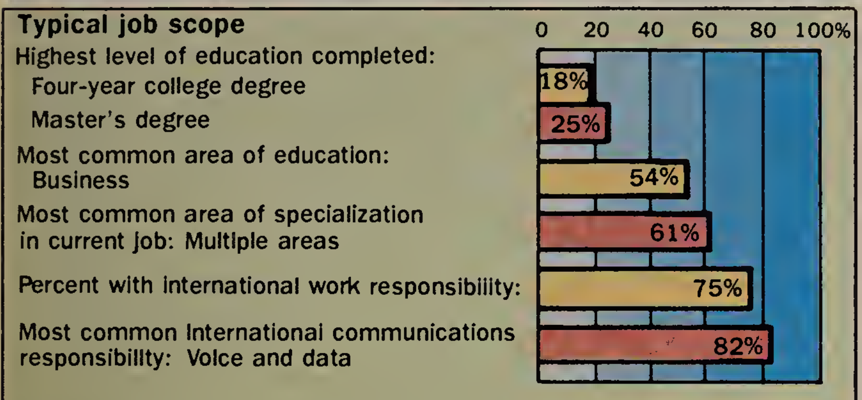

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SOURCE: INTERNATIONAL COMMUNICATIONS ASSOCIATION, DALLAS

ASSOCIATIONS

The **National Association of State Telecommunications Directors (NASTD)** is urging its members to support the International Standards Organization's (ISO) seven-layer Open Systems Interconnect (OSI) model. During its annual meeting and trade show, which ended Oct. 20, the group passed a resolution calling on its members to patronize vendors that have voiced support for ISO standards.

"This is not a mandate, but a strong recommendation for directors purchasing equipment to utilize standards, include them as part of specifications and give weight to the company that offers them," said Pam Yost, a research assistant for the Center for Management and Administration of the Council of State Governments.

Yost said 40 states were represented at the meeting, which was attended by 200 people from both the public and private sectors.

The group's plans for 1988 include a 50-state survey of state telecommunications management and organizational structures, budgets, purchasing and personnel, according to Yost.

NASTD's executive board, which will take office in January, was inducted at the meeting. Al Tolman of California will serve as president; Sam Rule of North Carolina will serve as first vice-president; the second vice-president will be Steve Robinson of Nebraska; George DesAutels of Virginia will serve as secretary/treasurer; and current President George Christienberry will continue to serve on the board.

The **Wisconsin Health Care Telecommunications Association** held its annual conference and exposition in Milwaukee on Oct. 22 and 23.

According to Recording Secretary Cathryn Withers, of Childrens Hospital in Milwaukee, the group is focusing on educational opportunities as it enters its third year. "Telecommunications in health care is highly misunderstood and neglected," Withers said, noting that the group is working on lobbying internally. "We're trying to get the word out in our own institutions. We want to show what our impact can be if we are given the opportunity to show the many ways we can contribute," according to Withers.

She said the organization's next meeting will be held in January in Wausau, Wis.

When it comes to Wall Street's recent plunge and how it has affected users, "Everyone's been calling us," said Phyllis Lampell, president of the **Wall Street Telecommunications Association**. "But we don't have that information, and I'm not sure people will share that information with us." Nevertheless, Lampell said, she is considering surveying the group's members about the crash's effects.

▶ *CORPORATE STRUCTURE*

Telecom managers to top brass: Listen up

CMA members voice frustration at lack of clout.

BY MICHAEL FAHEY
Senior Writer

UNIONDALE, N.Y. — Members attending the recent Communications Managers Association (CMA) conference here agreed it can be difficult to wield networking technology as a competitive weapon if a company's organizational structure prevents communications professionals from being heard by upper management.

Users at the CMA show said that, when a communications manager is too far down on the organizational chart or when upper management does not include the manager in strategic planning, strategic opportunities can be squandered.

"Telecommunications managers should have the complete support of top management," according to Steven Barish, assistant vice-president at The Bank of New York.

"They must be sitting in on planning sessions. When they say something, it must be listened to and taken seriously. Then they should be in a position to go to the subordinates and put the plan into action," Barish said.

Such a situation is ideal, according to Barish. In reality, he said, communications managers are all too often called upon to implement plans not of their making. Also, managers' views often go unheeded. This generally leads to an inefficient use of communications technology, according to Barish.

Burr Clausen, systems manager at Dun & Bradstreet Information Resources in Murray Hill, N.J., said he does not play a part in his company's strategic planning process and, because of this, he is not able to deliver the kind of communications support he would like for end users.

"There is no doubt we would be able to deliver better service if we had a bigger role in the planning process," Clausen said.

According to Clausen, the communications staff at Dun & Bradstreet is not in a

See page 26

GUIDELINES

ERIC SCHMALL

The Law of Reverse Intent turns solutions into problems

Rather than let events drift, effective managers take direct action to solve problems and take advantage of opportunities to improve the workings of their organizations.

In pursuit of these honorable goals, however, communications managers sometimes find themselves foiled by the Law of Reverse Intent. This principle, similar to Murphy's Law, describes those ironic occasions when good intentions bear bitter fruit. Reverse Intent occurs whenever a person attempts to improve a situation and, as a result of that effort, worsens it.

Examples abound in all industries. A utility company urges its customers to take conservation measures to cut down on utility costs. Customers comply, depressing demand so much that the utility has to raise its rates.

The modern communications manager is particularly vulnerable to this galling principle. Well-meaning attempts at improving an aspect of the communications system — for example, system capacity, response time or availability — often backfire and cause greater grief.

Consider the example of a voice mail system. Having experienced modest growth in use after its first year of operation, one of its key components, disk storage for messages, approaches a critical threshold. Budget constraints rule out adding a new disk in the near future.

In order to meet these demands, the manager hits upon the idea of eliminating from the system users who take infrequent advantage of it. The intent: improve service without a hardware upgrade. The result: The system locks up only days after the solution goes into effect.

In reviewing the situation, it becomes apparent that eliminating people who seldom, if ever, use the system will not free up very much disk space. And, by inviting eager new participants, the manager has exacerbated the original problem.

See page 26

Schmall is network systems manager for an insurance holding company.

The Law of Reverse Intent

continued from page 25

A similar situation involving data communications comes to mind. Line capacity for a large group of remote users reaches a saturation point. The communications manager decides to establish a channel with much wider bandwidth to alleviate the bottleneck and to provide capacity for future expansion.

The intent: significantly improve response time, improve productivity and provide capacity for expansion. The result: After the installation of the new bandwidth, the surge of data flowing from remote users causes a severe overload of the host system, thereby worsening response time for both the remote users and for other users of the host.

In both examples, good intentions and perfect execution of a plan make a bad situation worse.

The prime failure in these and other examples results from a fundamental misunderstanding of a communications system's complex interrelationships. Those who attempt to solve a problem by addressing one variable are setting themselves up to be victims of this perverse maxim.

It is rare for a communications problem to be caused by one factor. And it is rarer still that a proposed solution will affect only an isolated aspect of an entire system. ☒

Managers to top brass: Listen up

continued from page 25

position to have contact with senior management. Clausen declined to provide details on the company's organizational structure.

Get close to upper management

Don Gaffney, vice-president of Fundamental Information Systems, a subsidiary of Williams Street Brokers in New York, agreed that a close working relationship with upper management is essential for communications managers who want to use communications to further their organizations' business goals. "The less exposure you have to senior management, the less opportunity you have to express your ideas," Gaffney said.

Fundamental Information Systems was founded three years ago to support the communications and data processing needs of Williams Street Brokers. Gaffney reports to an executive vice-president, who in turn reports to the president of Fundamental Information Systems. According to Gaffney, he and his superiors work closely with Williams Street Brokers' upper management.

He said this is because top management recognizes the importance of communications and information systems for success in its business.

"If upper management does not have a basic understanding of the strategic role of information systems and communications, it is very hard for the communications manager to become part of the business planning process," Gaffney said.

Mukesh Shah, director of communications at City Federal Savings Bank in Somerset, N.J., said upper management at his organization places a great deal of emphasis on the role of communications in furthering its business goals. Because of this, Shah said, he is able to share with upper management his ideas on how communications can be used strategically.

His mandate is to provide reliable, cost-effective communications systems that will help the bank be more competitive, he said. As Shah consolidates many of the bank's back office operations, he is also consolidating traffic from a number of different facilities onto T-1 lines.

Communications managers here agreed that it is difficult to effect changes in companies that do not grasp the importance of communications in serving business ends.

Predivestiture leftovers

According to Bank of New York's Barish, many conservative organizations have retained a communications philosophy left over from predivestiture days. He said that because upper management's concerns appear to be limited to getting a dial tone, he feels most challenged in the face of an emergency.

"I love crises," Barish said. "When something goes wrong, when someone digs up New York Telephone cable, that's when I feel important."

Dun & Bradstreet's Clausen said many companies will not begin giving communications professionals freer rein to implement new applications until an upper level manager champions communications technology or a competitor implements communications for business advantage.

Gaffney said he believes that getting caught behind the eight ball is a strong incentive for many companies, but it could have severe consequences for those that remain slow to react to the changing role of communications in business. ☒

Roy Gemberling, V.P. and General Manager, Digilog Inc.

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NEW PRODUCTS AND SERVICES

See inside for:
- ▶Lanstar Appletalk
- ▶General DataComm modems
- ▶Coastcom's T1M

▶*LOCAL NETWORKS*

NBI adds TCP/IP support to OASys server software

BY JIM BROWN
New Products Editor

BOULDER, Colo. — NBI, Inc. recently released a new version of its OASys system software that supports the Transmission Control Protocol/Internet Protocol, enabling its 500 series and OASys line of file servers to exchange electronic mail and files with Unix-based minicomputers from Digital Equipment Corp. and Ethernet-attached devices.

The company also announced it will sell a private-label version of Calgary, Alberta-based Keyword Office Technologies, Ltd.'s document translation software. That personal computer-based package, which NBI dubbed Tailorable Import/Export (TIE), will convert documents created under 15 different personal computer word processing packages to NBI document format.

NBI's OASys Release 5.7 now supports the Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP) and Telnet virtual terminal protocol, all of which are included in TCP/IP. SMTP supports the exchange of E-mail between dissimilar systems via TCP/IP, while FTP supports file transfer between dissimilar computers. Telnet enables a remote device to log on to a server via a TCP/IP network.

With the new release, IBM Personal Computers linked to an NBI OASys server are now able to access other NBI, IBM, DEC and Unix-based systems on the same Ethernet backbone network to exchange mail, access applications and transfer files.

Personal computers able to access VAX

Personal computers linked to an NBI OASys network will also be able to emulate a DEC VT-100 terminal to access a VAX. When linked, the microcomputer will be able to access DEC applications, transfer files via FTP and exchange OASys and VMS Mail via SMTP. Software running on the VAX is required to convert mail messages between NBI formats and DEC VMS Mail formats.

The new release also enables a personal computer linked to an NBI system to exchange mail and attachments with Unix-based systems via SMTP. NBI software running on the OASys will convert the mail messages.

A wide-area network function in the new release enables users to route messages through the NBI 570 file to remote users as if they were locally attached. Previously, NBI message-routing software could not recognize addresses of devices attached to remote systems.

The new release also enables an NBI 570 to act as a TCP/IP routing node that provides a bridge between TCP/IP-based backbone Ethernet local nets. In effect, the routing capability extends the number of addresses an Ethernet-attached device can reach. The router receives requests and forwards them to another device on a different Ethernet.

NBI's TIE resides on NBI OASys 64 and OASys 66 series multiuser microcomputer or on a stand-alone personal computer. It supports the conversion of documents created with such popular word processing packages as WordPerfect Corp.'s WordPerfect,

See page 32

▶*FACSIMILE*

U.S. Fax to offer packet fax service

BY JIM BROWN
New Products Editor

PHILADELPHIA — US Fax, Inc. recently unveiled plans to offer a packet switching-based nationwide facsimile network service that is intended to slash customers' facsimile calling costs by up to 74%.

Using the firm's US Faxsys network, a typical three-page facsimile transmission from Boston to San Francisco would cost 24 cents instead of 91 cents using AT&T standard dialup long-distance lines, according to the company.

US Fax, using technology developed by Facsimile Science Corp., said it will deploy 20 packet assembler/disassemblers around the country and link them using AT&T's Accunet packet-switching service. Subscribers to US Faxsys will rent facsimile mailboxes for a monthly fee and pay per-packet usage charges.

To send a facsimile, subscribers will dial either a local number or a toll-free 800 number to access one of the US Faxsys proprietary PADs and then enter an account number, a delivery code and the receiving facsimile's phone number.

The PAD will forward the message via AT&T's Accunet packet-switching service to the PAD nearest the intended receiver. That PAD will dial the local facsimile's phone number and deliver the message, regardless of whether that user is a subscriber or not. Subscribers, however, have the option of instructing the PAD serving their area to store incoming messages in a mailbox linked to the PAD for later retrieval.

If the intended recipient is busy, US Faxsys will continue trying to deliver the message for a specified period of time and transmit message-delivery status messages to the sender. Senders can also store a message distribution list with US Faxsys and instruct the company to send a copy of a single message simultaneously to all people on that list.

A Tandem Computers, Inc. NonStop system at the firm's Philadelphia headquarters will monitor traffic on the network and calculate usage charges.

US Faxsys will also begin placing facsimile machines in airports, hotels and other public locations across the country, enabling subscribers to enter their account numbers and to send messages from these machines.

Expected to begin operation in January, US Faxsys is charging initial subscribers a fee of $2 per month. Subscribers that join the network after January will be charged $10 per month. Each subscriber will also be charged transaction fees based on the number of packets sent.

US Faxsys is located at 100 N. 17th St., Philadelphia, Pa. 19103, or call (215) 496-8000.

In a related development, Sir Speedy, Inc. recently announced it will install facsimile machines in its printing shops nationwide. With its Fastfax network, Sir Speedy customers will pay a fee to transmit a document to another facsimile over dial-up lines.

Sir Speedy will place Murata Business Systems, Inc. facsimile machines in its locations in 41 states. Customers will pay $10 to transmit a five-page document to any facsimile worldwide. The machines can also be used to send and receive facsimile messages with Sir Speedy printing customers.

Sir Speedy is located at 23131 Verdugo Drive, P.O. Box 30740, Laguna Hills, Calif. 92653, or call (714) 458-1297.

▶*MULTIVENDOR ACCESS*

Icon micro servers debut

BY JIM BROWN
New Products Editor

OREM, Utah — Icon International, Inc. last week introduced a family of microcomputers that can be used as network application and file servers supporting communications among IBM Personal Computers, Unix-based workstations and ASCII terminals.

The so-called MultiMicro/Mainframe, which supports four different operating systems, enables different makes of workstations and terminals to exchange files. The same functions can be realized in a Novell, Inc. NetWare local network environment by configuring the product as a network file and application server.

Icon, which is partly owned by Sanyo Electric Co., Ltd., designed the new systems to run concurrently its own implementations of Microsoft Corp.'s MS-DOS, AT&T's Unix System 5 Release 2, Berkeley Software Distribution's Unix Version 4 Release 2 and Pick Systems' Pick operating systems.

This enables IBM Personal Computers to run Unix or Pick applications, Unix workstations to run DOS or Pick applications and ASCII terminals to access any application.

The firm's 16-user Icon MultiMicro/Mainframe 2000, 64-user Icon MultiMicro/Mainframe 3000 and 128-user Icon MultiMicro/Mainframe 4000 run Icon's ICON/OS operating system,

See page 32

First Look

Apple, Northern Telecom release Lanstar AppleTalk

Apple Computer, Inc. and **Northern Telecom, Inc.** announced a new local-area network and two related products for Macintoshes.

The star-configured **Lanstar AppleTalk** enables Macintosh IIs outfitted with a Lanstar interface card and software to use twisted-pair wire to link to a Meridian Lanstar hub at speeds up to 2.56M bit/sec. Applications from Apple's existing AppleTalk are said to be compatible with the new network. The network provides access to files and services such as electronic mail using existing AppleTalk commands.

Apple and Northern Telecom also announced **Lanstar AppleTalk Bridge** software. The package runs in background mode on a Macintosh II linked to a Lanstar AppleTalk or Farallon Computing PhoneNet. The product enables up to 31 other Macintosh models and peripherals as well as IBM Personal Computers to access devices linked to the Lanstar AppleTalk or PhoneNet networks.

The third product announced, called **NetAccess,** is software enabling remote Macintoshes to access the Lanstar AppleTalk network. The software resides on the remote Macintosh and supports a link speed of up to 19.2K bit/sec.

Lanstar AppleTalk is priced at $5,400. The Lanstar AppleTalk Bridge is priced at $295. The Lanstar interface card is also priced at $295. NetAccess is priced at $595.

Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014, or call (408) 996-1010.

General DataComm releases bevy of new products

General DataComm Industries, Inc. introduced five new modems and a host of other communications gear.

The **NMS 1800, NMS 14433, NMS 14434, NMS 14436** and **NMS 19202** private-line modems are designed to be controlled from a central site outfitted with General DataComm's Netcon network management system. Each incorporates diagnostics that report alarms to Netcon whenever user-defined parameters are exceeded.

The NMS 1800 is an 1,800 bit/sec modem that operates in both point-to-point and multipoint applications and is priced at $1,295. The $4,995 NMS 14433, $5,495 NMS 14434 and $5,995 NMS 14436 are point-to-point, 14.4K bit/sec modems. The NMS 14434 features an integral four-channel multiplexer while the NMS 14436 features a six-channel multiplexer.

Each multiplexer channel ranges from 1,200 to 14.4K bit/sec. The NMS 19202, priced at $9,995, is a 19.2K bit/sec point-to-point modem incorporating a two-channel multiplexer that supports channel rates up to 19.2K bit/sec.

The firm's **DATX 2010** data-over-voice unit fits under a telephone and enables a variety of RS-232-compatible devices to use telephone lines as links to data processing equipment. The device transmits synchronous or asynchronous data at up to 19.2K bit/sec in half- or full-duplex mode, with or without error correction. It can also access X.25 packet-switching equipment. Prices start at $335 for a stand-alone unit and $495 for a rack-mounted card.

The firm's **Megaswitch Compact** modular T-1 switching multiplexer supports 58 channels and is compatible with both the D4 superframe format and the digital access cross-connect format. A company spokesman said the product is intended for use in three-node T-1 networks or as a node at lower density sites that feed into larger backbone T-1 networks. The Megaswitch Compact sells for $11,800.

The company also announced an **X.25 Gateway** card that resides in its Gen*Net 1264 switching multiplexer. The gateway enables Gen*Net-attached devices to access packet-switched networks, host computers and packet assembler/disassemblers that adhere to the CCITT X.25 standard.

The firm also introduced software enabling an IBM Personal Computer AT operating with DOS Version 3.2 to act as the control console for Megaview, the company's network management system. The package costs $4,500, but General DataComm will sell a personal computer and software for $13,000.

In addition, the company enhanced its Kilomux 1281 multiplexer, which operates at up to 64K bit/sec, with two new cards that integrate voice and asynchronous data into the unit. The **1281 Voice Card,** priced at $675 per channel, enables the Kilomux 1281 to incorporate voice circuits as well as data channels. The $995 asynchronous data card, dubbed **Kaquad,** provides four asynchronous data channels operating at up to 19.2K bit/sec.

General DataComm Industries, Inc., Middlebury, Conn. 06762, or call (203) 574-1118.

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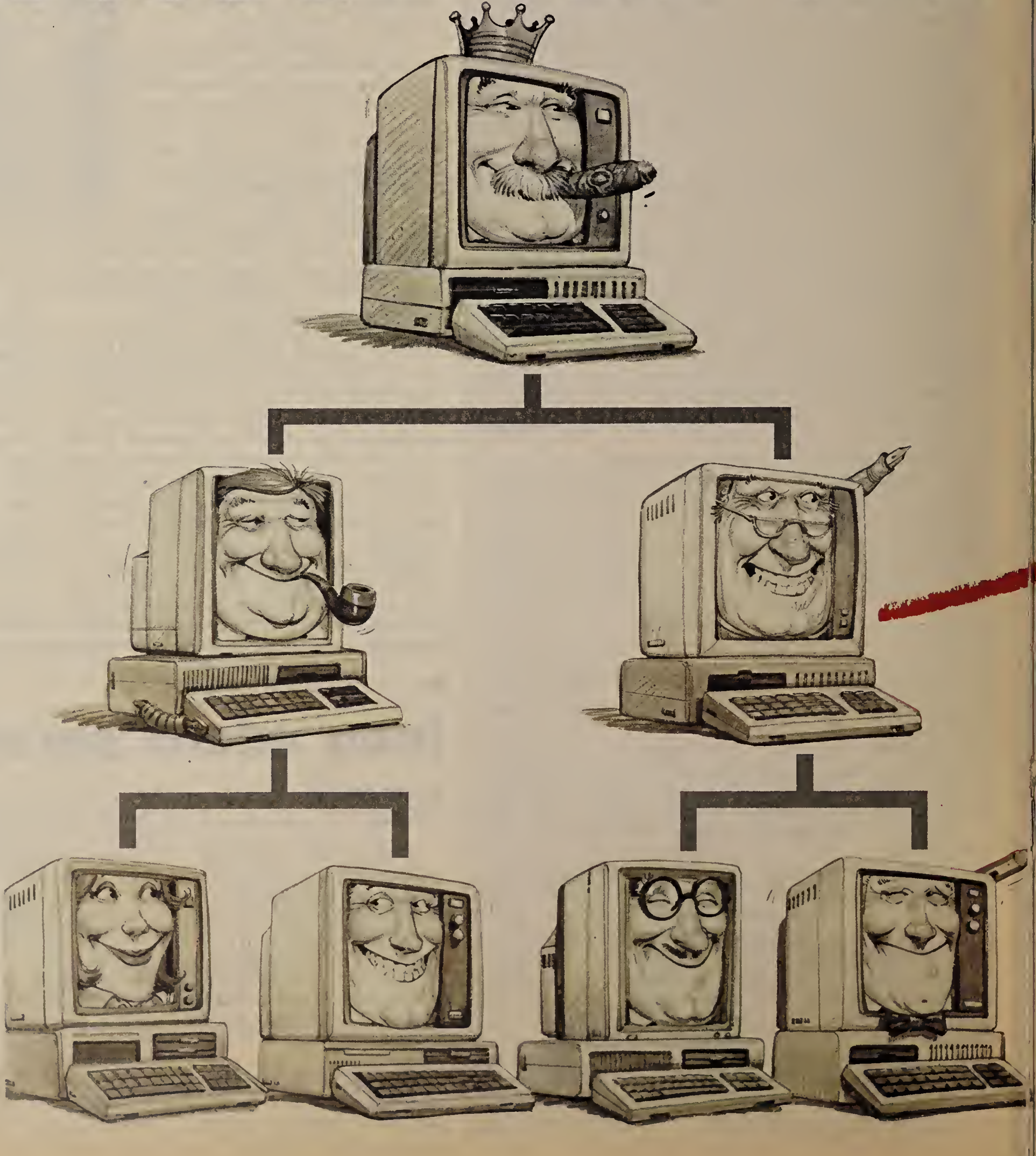

Coastcom expands T-1 product line

Coastcom announced a unit that converts V.35, RS-232 and RS-422 interface signals to a T-1 signal.

The **T1M** supports four data ports and an optional voice maintenance port. Each of the four data ports can be configured to support speeds up to 512K bit/sec, as long as the overall speed of all four ports does not exceed 1.536M bit/sec.

The T1M complies with D4 superframe and digital cross-connect standards at DS1 and DS0 levels. It is also said to be compatible with AT&T's Dataphone Digital Service. The unit also supports a drop-and-insert capability supporting multisite polled data transmission applications. Optional menu-driven software is available to enable network control personnel to change configurations and run diagnostic routines from a remote location.

T1M pricing starts at $3,895.

Coastcom also announced a software-controlled version of its D/I Mux drop-and-insert T-1 multiplexer. The **D/I Mux II** enables an ASCII terminal to be used to load configuration information into the unit and perform diagnostics.

This package includes control of common equipment and smart channel units. The D/I Mux II is D4-channelized and permits drop and insert on a DS0-channel basis.

Pricing for the D/I Mux II begins at $5,000.

Coastcom, P.O. Box 27068, 2312 Stanwell Drive, Concord, Calif. 94527, or call (415) 825-7500.

Starlan, ThinWire Ethernet linked to backbone net

Retix announced a local-area network bridge that links ThinWire Ethernet and Starlan segments to larger Ethernet backbone nets.

The **RetixGate Model 2244 MAC Bridge** also enables local network managers to segment an Ethernet into subnetworks that confine local work-group traffic to local subnetworks. Linking subnetworks through a bridge also extends the maximum distance and overall number of devices an Ethernet network can support.

Based on a Motorola, Inc. 68000 microprocessor, RetixGate processes up to 6,000 packet/sec. The device requires no software load or network configuration information and has built-in adaptive firmware that continuously monitors traffic on attached networks and builds its own configuration tables.

The RetixGate Model 2244 MAC Bridge is available now for $1,950. Quantity discounts are available.

Retix, 2644 30th St., Santa Monica, Calif. 90405, or call (800) 233-2555 outside California or (213) 399-2200 in California.

Mainframes and minis linked to facsimile

Murata Business Systems, Inc. introduced an interface unit that links ASCII mainframes and minicomputers to its ImageMaster facsimile machines.

The **Murata Facsimile Interface Processor (FIP)** allows documents stored on an ASCII mainframe or minicomputer to be transmitted to an ImageMaster, which can then call other facsimile machines and deliver a message. The FIP, available as an option to ImageMaster units, plugs into a mainframe's RS-232-C port and a port on the ImageMaster. Although the FIP requires a host-resident software program to be written by the user, Murata provides control codes to simplify the programming.

A Murata spokesman said potential FIP applications include mass mailings, corporate billing procedures and distribution of promotional materials to customers.

The FIP is priced at $1,995 when bought with the ImageMaster facsimile machine and $2,495 when bought alone.

Murata Business Systems, Inc., 4801 Spring Valley Road, Dallas, Texas 75244, or call (214) 392-1622.

Wireless local-area network operates via radio

Ray-Net Communications Systems, Inc. released a wireless local-area network operating via radio.

Designed for transaction processing applications, **Ray-LAN** consists of an IBM Personal Computer adapter board linked to a radio frequency transceiver adjacent to the workstation and proprietary Ray-LAN software that is compatible with Novell, Inc.'s Advanced NetWare network operating system. The product supports speeds up to 19.2K bit/sec.

The new product can be used to create new local-area networks or to bridge existing local nets running Advanced NetWare.

List price for Ray-LAN is $1,995 per node, including the transceiver, the adapter board and software. The product will ship in January.

Ray-Net Communications Systems, Inc., E. 12806 Nora Ave., Spokane, Wash. 99216, or call (509) 924-2855. ☐

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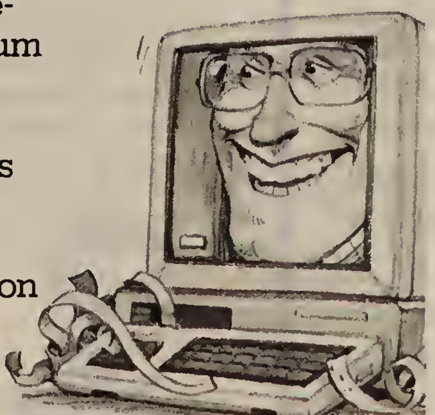

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Dr. John McQuillan, President, McQuillan Consulting

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T-2 MULTIVENDOR/MULTIARCHITECTURE LANS: MAKING THEM WORK

Dr. Kenneth Thurber, President, Architecture Technology

Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs. **Level:** Advanced.

T-3 ISDN: STANDARDS, PRODUCTS AND SERVICES

James G. Herman, Independent Consultant, formerly with the Telecommunications Consulting Group at BBN

ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years. **Level:** Intermediate.

T-4 MULTIVENDOR NETWORK MANAGEMENT

Jerry McDowell, Vice President, Vanguard Telecommunications Inc.

Enroll in this intensive tutorial for skills in how to manage a network which links multiple carriers and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service. **Level:** Intermediate.

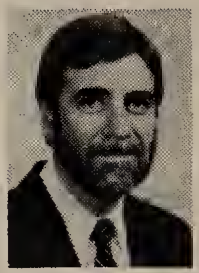
T-5 HOW TO BECOME A BETTER TELECOMMUNICATIONS MANAGER

Gerald P. Ryan, President, Connections Telecommunications Inc.

Today's network manager must not only understand new technologies and standards, but must also play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency. **Level:** Intermediate.

T-6 THE LATEST LOOK AT NETWORK STANDARDS AND OSI

Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.



As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements. **Level:** Introductory.

T-7 MODELING AND DESIGNING DATA AND INTEGRATED NETWORKS

Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University

Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems, plus cost-efficiency issues and other practical considerations. **Level:** Advanced.

T-8 IBM NETVIEW: INDUSTRY WIDE IMPLICATIONS

Atul Kapoor, Vice President, Kaptronix Inc.

This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependencies and functional interactions, plus an analysis of their impact on the industry, significance for users, and practical suggestions for implementation. **Level:** Intermediate.

T-9 OPEN NETWORK ARCHITECTURE: CARRIER/VENDOR/USER IMPLICATIONS

Haines Gaffner, President, LINK Resources Corp.

The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be. **Level:** Intermediate.

T-10 INTERNATIONAL NETWORKS: SOLVING THE PRACTICAL PROBLEMS

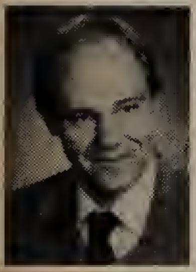
Len Elfenbein, President, Telcom Systems Group

Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed. **Level:** Intermediate.

cess network!

telecom professionals—CN '88, January 25-28

T-11 BUILDING THE NETWORK CONTROL CENTER
Gabe Kasperek, President, Kazcom Inc.



This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network. **Level:** Introductory.

T-12 REGULATORY ISSUES AND ANSWERS
Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social, and regulatory issues, the evolution of vendor technology and industry standards, and significant developments affecting the coming regulatory year. **Level:** Intermediate.

T-13 INTRODUCTION TO DATA COMMUNICATIONS
Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry. **Level:** Introductory.

T-14 INTRODUCTION TO VOICE COMMUNICATIONS AND PBX
James Morgan, Principal, J.H. Morgan Consultants

Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs and services, as well as an overview of traffic engineering. **Level:** Introductory.

T-15 IMPACT OF THE NEW POST-DIVESTITURE TARIFFS ON LARGE NETWORKS
Robert L. Ellis, President, The Aries Group

In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how to use them. **Level:** Intermediate.

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Icon micro servers debut

continued from page 27

which controls the interaction among the four operating systems and personal computers, Unix workstations and ASCII terminals.

The systems will support a gateway to X.25 packet-switching networks. The firm intends to provide links between mainframes and minicomputers from such vendors as IBM, Digital Equipment Corp. and Unisys Corp. in future versions of the product.

The new systems also support a Shared Memory Interconnect Local Environment (SMILE) option, which enables up to six personal computers to link to a MultiMicro/Mainframe disk cache processor over a distance of 1,000 feet. The option requires the addition of boards in the MultiMicro/Mainframe and each personal computer.

Using Icon Services software, SMILE supports virtual disk, virtual terminal, file transfer and print spooling functions for attached personal computers:

- The virtual disk function allows personal computers to store and retrieve files from the Icon system's disk at direct memory speeds of up to 4M byte/sec.
- The virtual terminal function enables the personal computer to establish four concurrent links to the CPU in order to access and toggle between four different applications.
- The file transfer function enables the personal computer to move files between Unix, Pick and MS-DOS formats, while the print spooling function enables a personal computer to print files on an Icon system-attached printer while processing other applications.

ICON/OS also supports a virtual resource architecture that makes personal computers and Unix-based workstations appear to the system as ASCII terminals. Menu-driven software enables those users to establish up to four links with Unix, MS-DOS or Pick applications running on the Icon system and then to toggle between them.

Each Icon system features three microprocessors that operate in parallel mode: the central processor, the disk cache processor and the peripheral communications processor (PCP).

The CPU executes most of ICON/OS as well as user applications. It also controls all math functions via a floating-point coprocessor. It uses a Motorola, Inc. 68020 microprocessor to execute Unix and Pick applications and an Intel Corp. iAPX 80286 coprocessor for MS-DOS applications.

The disk cache processor uses a proprietary algorithm to track the data and program code that the CPU frequently requests from the disk subsystem. That data and program code is stored in a dynamic random access memory buffer of up to 8M bytes.

The PCP acts like a terminal controller supporting 16 asynchronous serial ports operating at 38.4K bit/sec. Each of the 16 ports can support RS-232 links. Up to four of the ports are capable of supporting RS-422 links, and two of the ports support IBM 3270-type synchronous communications. Each PCP port will support standalone devices or a string of eight devices linked to an Icon Distributed Communications System-3 controller.

The Icon MultiMicro/Mainframe 2000 is priced at $15,000, the Icon MultiMicro/Mainframe 3000 costs $30,000 and the Icon MultiMicro/Mainframe 4000 is priced at $55,000.

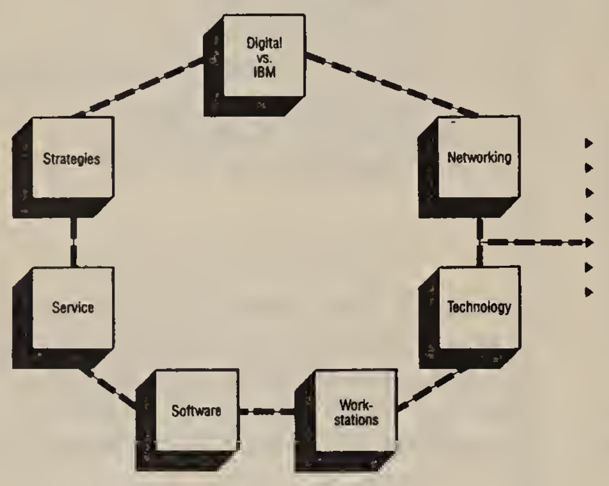
Icon International is located at 774 S. 400 East, Orem, Utah 84508, or call (801) 255-6888.

> The virtual disk function allows personal computers to store and retrieve files from the Icon system's disk at direct memory speeds.

International Data Corporation Presents

Corporate Computing:

DEC and IBM, The Challenge Continues



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J. Carl Masi, Chairman & CEO, IDC

IBM's View of the Midrange Market
Steve Schwartz, IBM Vice-President; President, Systems Products Div.

The Midrange Competitive Environment
Dave Moschella, V.P., IDC

Battle for the Desktop: DEC/IBM
Vicki Brown, Manager, Technical Computing, IDC

The Network: DEC/IBM Strategies
Kim Myhre, V.P., IDC

Digital's Midrange Marketing Strategy
Bob Randolph, Director, DEC Advisory Service, IDC

Day 2 .... 8:30am — 1:00pm

Application Software: Vertical Market Thrust
Digital Executive (TBA)

Making Tough Choices
Steve Widen, Sr. Analyst, DEC Advisory Service

Customer Service: The New Frontier
Rebecca Segal, Director, Customer Service, IDC

Assessment of DEC's Application Thrust
Ted Jastrzembski, Director, Software and Services, IDC

Financial Health in the Midrange
John Levinson, V.P., Goldman Sachs & Company

Emerging Technologies
Will Zachmann, Corp. V.P., IDC

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Hotel reservations should be made directly with the Disneyland Hotel, Anaheim, CA, **(714) 778-6600**. A block of rooms will be held until four weeks prior to the conference.

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NBI adds TCP/IP support to OASys

continued from page 27

Microsoft Corp.'s Microsoft Word, Micropro International Corp.'s WordStar, IBM's DisplayWrite 2 and DisplayWrite 3, Wang Laboratories, Inc.'s WPC and WPS, and Office Solutions, Inc.'s OfficeWriter into NBI format.

NBI also announced its DISOSS gateway will now support IBM's document library services, which enable users to archive and retrieve documents stored using Document Content Architecture and Document Interchange Architecture.

The OASys software Release 5.7 is free to users of current NBI systems. A version of TIE supporting 16 NBI OASys 64 or OASys 66 users will cost $2,795. A stand-alone personal computer version of TIE will sell for $1,795. An NBI DISOSS Gateway supporting document library services will be available later this year for $7,000.

NBI is located at 3450 Mitchell Lane, P.O. Box 9001, Boulder, Colo. 80301, or call (303) 444-5710.

Thanks, ICA members, for making Network World your best-read communications-oriented publication.

NETWORK WORLD

Gary J. Beach
Publisher

"Rome wasn't built in a day." Although you've heard this saying time and time again, the philosophy behind it — that through hard work you can make things better day by day, week by week, and year by year — remains sound.

It's this very philosophy that *Network World* editors have followed during the past 18 months. And in doing so, they have remained true to their initial goal: to make each issue of *Network World* the best possible for you, our readers.

Evidence is growing that *Network World's* long-term commitment to editorial excellence is paying off. In fact, the latest study conducted by an independent research firm among ICA members shows rather impressive results. Not only does *Network World* top the list of communications-oriented publications in receivership, but it now ranks number one in readership as well.

As you can see in the following charts, both receivership and readership of *Network World* among ICA members have steadily increased since July 1986. However, during this time period, these same ratings have declined for almost every other communications-oriented publication.

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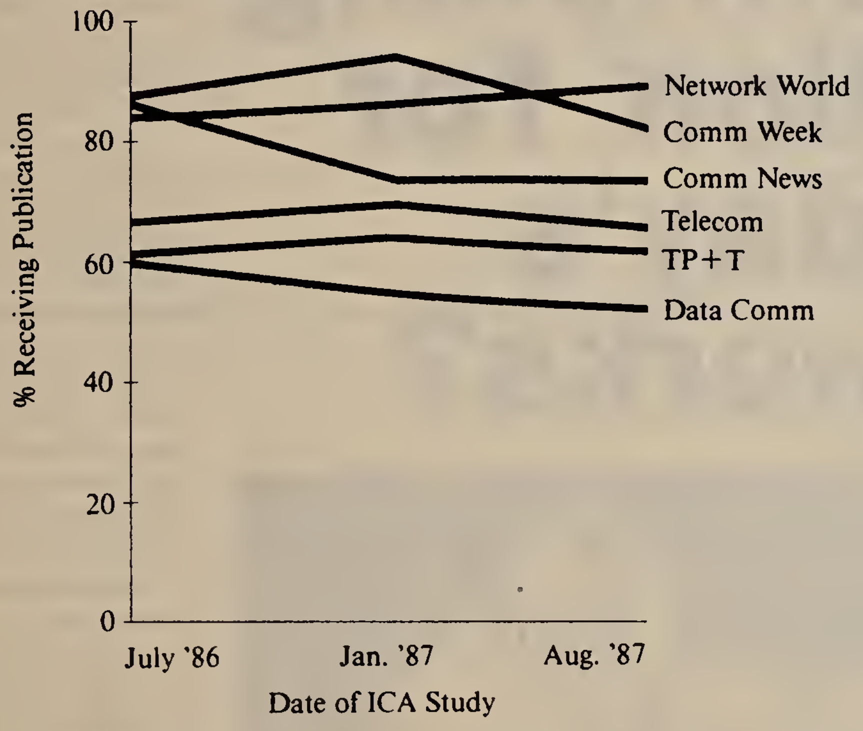

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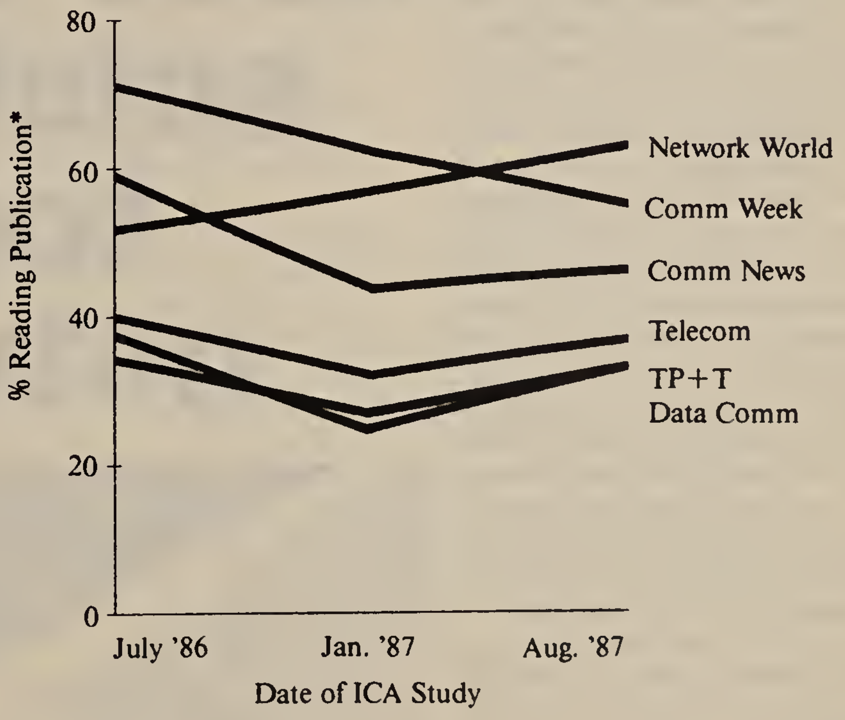

* Readership figure for each publication is based on the number of ICA members who receive that publication.
Studies conducted by First Market Research of Boston.

There's no question about it. *Network World's* in-depth networking coverage is what enables us to deliver a unique editorial product that progressive communications users have come to rely on week after week.

Thanks to the growing support of ICA members and continued dedication of all our readers, *Network World* is now the number one communications-oriented publication for today's leading-edge users.

Cordially,

Gary J. Beach

Gary J. Beach
Publisher

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An IDG Communications Publication

PBX vs. Centrex

One of the most important strategy decisions communications managers face involves switching. Should a company buy, install and maintain its own private branch exchange? Or should it take advantage of Centrex central office-based services offered by the Bell operating companies?

Centrex was an invention of the old AT&T. Offering what was then state-of-the-art switching services for almost any size business, Centrex had many advantages over contemporary PBXs. In the 1960s and 1970s, Ma Bell boasted more than eight million Centrex access lines across the nation.

Beginning in the late '70s, however, Centrex began to feel intense competition from sophisticated computer-based PBXs. These digital switches offered more features than Centrex, as well as on-premises control and more attractive pricing. AT&T even considered dropping Centrex in favor of its own PBXs.

Divestiture breathed new life into Centrex. As the Baby Bells scrambled to compete in the new market, they discovered a treasure in the attic: Centrex. Dusted off and polished up with new features, Centrex has returned as a strong competitor to today's digital PBXs, including offerings from the inventor of the service — AT&T.

So, decades after it began, managers again face the basic switching dilemma: PBX or Centrex? This exclusive Network World *debate poses that question to two established communications consultants.*

Which is the best switching solution for today's networks?

BY GARY KERN
Special to Network World

The advantages of selecting a PBX over Centrex can be summarized in three key areas: control, consistency and cost-effectiveness.

While these advantages are evident in decisions involving a system for a single location, they're magnified when multiple locations are involved. This is due to one fact: All Centrexes are not created equal.

Suppose a communications manager has decided to employ digital technology for the company's new telephone system. There is a vast array of vendors from which a digital PBX can be selected. With Centrex service, however, this choice is lost, since Centrex is dependent on what the local central office offers; digital Centrex may or may not be available, and the user loses control of the decision, which now rests with the local telephone company.

Now expand the example to include a company with three locations: New York, Atlanta and Los Angeles. With a PBX vendor, the communications manager should have the following opportunities available: first, put the same system in all three locations for consistency; second, get the PBX vendor to assign an account team to handle the company's locations; third, negotiate a volume purchase agreement or corporatewide discount for cost-effectiveness; and fourth, negotiate a nationwide service and maintenance contract with the vendor for control, consistency and cost-effectiveness.

Centrex service in this example will offer none of these advantages. A Centrex from Nynex Corp. is not the same as a Centrex from BellSouth Corp. or from Pacific Telesis Group. Each regional Bell holding company has its own rate structure and payment options, its own Centrex features and its own sales and service organizations.

While Centrex advocates will argue that Centrex offers everything that a PBX does, the utilization of two key features — station message detail recording (SMDR) and the ability to do moves and changes — will clearly demonstrate PBX advantages.

- **Station message detail recording.** With a PBX, the communications manager has many SMDR options to choose from: how the data will be collected; when it will be collected; and what call records will be processed — local, long-distance, WATS or foreign exchange.

Centrex SMDR doesn't provide

Continued on page 51

Kern is a telecommunications analyst with Coopers & Lybrand in New York.

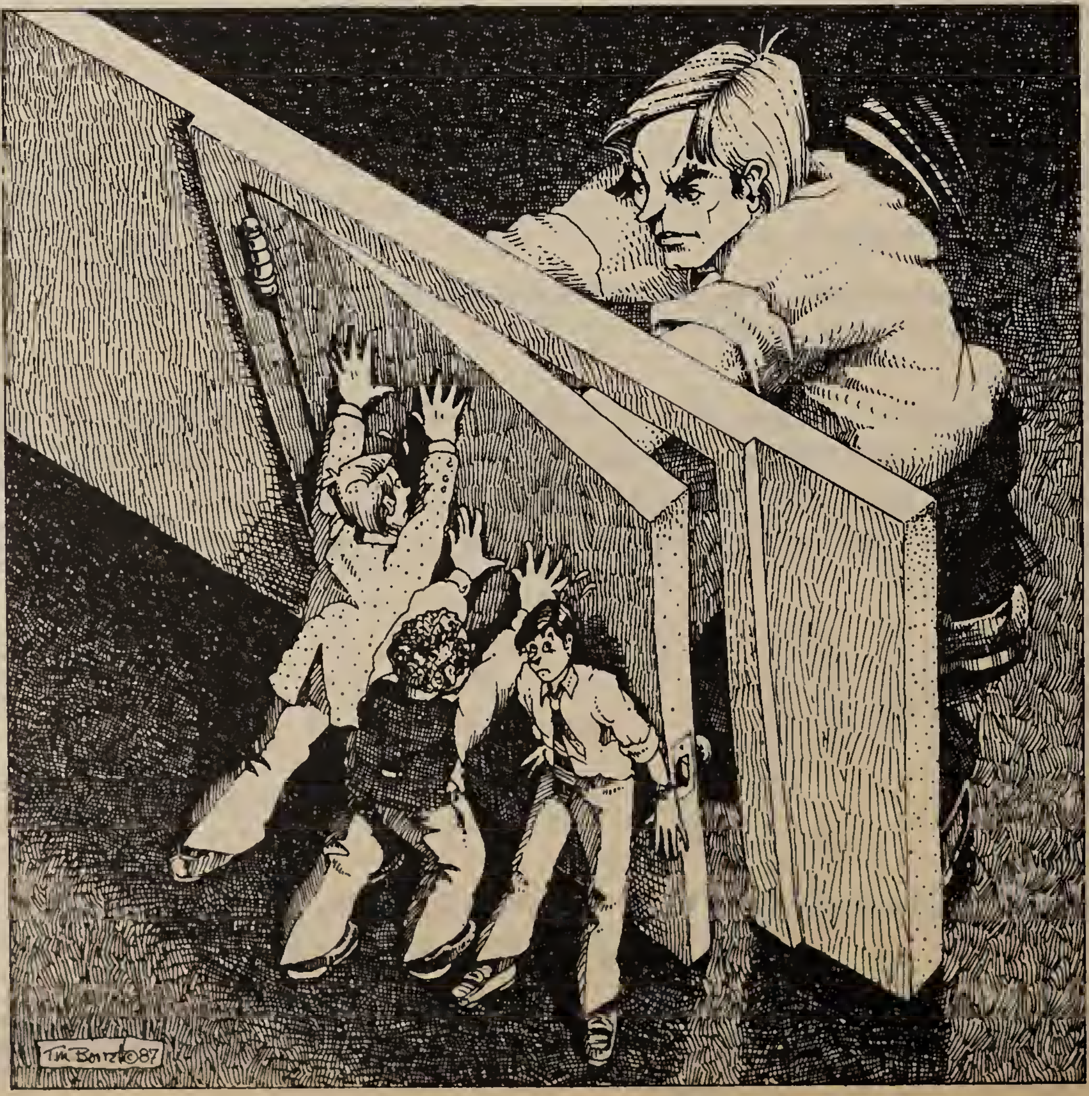


ILLUSTRATION ©1987 TOM BARRETT

BY SUSAN SERRITELLA
Special to Network World

The Centrex resurgence carries with it the same standards of reliability and continued technical support that made it a front-runner throughout the 1960s and 1970s. It also encourages users to consider many new competitive options when comparing Centrex to a private branch exchange.

Market positioning and the regional Bell holding companies' emphasis on Centrex as their flagship product certainly make it appear more attractive than ever before. But the service's improved technology, aggressive pricing and inherent flexibility prove Centrex is a sensible choice.

Centrex has reversed the technological factors that led users to invest in PBXs in the early 1980s. Now, Centrex can support the growing interest in data communications with asynchronous transmission up to 19.2K bit/sec, synchronous transmission up to 64K bit/sec, traffic switching without modems, access to packet-switched networks, local-area network access and compatibility with T-1 carrier specifications.

Software upgrades to AT&T's 5ESS central office switch or Northern Telecom, Inc.'s DMS-100 switch provide virtually all the enhanced voice and data features offered by a PBX.

The market's thrust toward increased competition motivated the RBHCs to introduce enhanced technologies in the central office that were initially intended to be network enhancements. These include virtual network services, packet switching, local-area networks and Integrated Services Digital Networks. ISDN field trials, using digital Centrex as their cores, are springing up around the country.

Sophisticated features, once perceived as exclusive to PBXs, have now become part of the regular Centrex lineup. Customer system management features, presented under various names by different RBHCs, facilitate changes in the system from an on-site terminal. Improved Centrex features, including automatic route selection, station message detail recording and outgoing trunk queuing, are now provided to meet customer needs. And Centrex users can be assured of continued feature advancements, as central office switch manufacturers compete to provide new and more refined features.

Pricing has become another sound advantage for Centrex. Centrex does not require an initial capital investment. This is an

Serritella is the editor of CCMI/McGraw-Hill's Centrex Planning Guide *and the weekly "Industry News Summary for Q-TEL 1000," an on-line data base.*

Opinions

▶TELETOONS — By Phil Frank

I see from your resumé, Mr. Walters, that you've jumped around the telecommunications industry quite a bit..
Phil Frank

important consideration for businesses that cannot afford to buy capabilities they will not use at first but might need sometime in the future. Initial PBX-related expenses include insurance, switch repair and maintenance charges, as well as additional staffing, space, environmental controls and utilities. Centrex has unlimited size capacity, making it most attractive for businesses subject to continual change. Centrex customers are never forced to pay for unused capacity.

The RBHCs have taken an eager approach to undercut PBX pricing even further. Rate stability plans, designed to fit individual customer needs, spread monthly rates and installation charges over a number of years; in some areas, this amortization period can stretch up to 10 years. Special rates and feature packages tailored to system size offer another alternative for users. In the under 125-station market — the largest Centrex growth category — the RBHCs offer the same features and service availability as larger systems, but the rates are priced to fit this lower end of the business market. Additional rate steps are outlined for medium-sized and large users, thereby allowing customers to choose packages to suit their own system needs.

In states where Centrex services are deregulated or detariffed, Centrex users will continue to experience reduced rates. Relaxed regulation allows the RBHCs to move away from rate-of-return-oriented pricing so they can compete more effectively and capture additional market share from the PBX vendors. Even in areas where Centrex remains tariffed, individual-case-basis tariffs have been filed to allow the RBHCs to design rates for a specific system arrangement, giving them a competitive edge over PBX vendors.

These new pricing strategies and structures, along with custom-designed systems, have allowed the RBHCs to become more readily adaptable to customer requirements. Their flexibility is also evident in the additional control Centrex customers can now find in their systems. The inherent flexibility of Centrex is a part of the benefits that have always been associated with the service.

Clearly, if customers look at Centrex once again, they will realize its advantages make it a stronger competitor than ever. ▣

EDITORIAL

Hardball is the game

As the one-stop shopping of predivestiture days recedes into the past, many users are learning that the best strategy for dealing with vendors is to forget all the other games and play hardball. Why, many managers ask, should users be reticent or overly tactful with a vendor that stands to make out like a bandit if it succeeds in selling its particular bill of goods?

This is not to say that users should always take an adversarial stance toward vendors. But users should bluntly state their intention to drive the market rather than be driven by it.

There's a six- or seven-figure bottom line on most contracts signed by large corporations that have implemented a cohesive networking strategy across multiple departments — and each such contract attracts plenty of hungry vendors.

For users that are tough negotiators, spending power translates into the power to influence the design of vendor products and services through strict procurement policies.

Vendors often try to persuade users to modify their networking requirements just so they can make use of an existing product. But market-driving users aren't going along with that any more.

Instead, when a product doesn't meet their needs, they're telling the vendor to make like a tailor and alter it to fit — or maybe even to make like a real estate developer and build to suit. This attitude makes sense: Consider how many vendors already offer custom software, hardware and systems integration services.

In addition to driving product development, users can also influence the implementation of standards in vendors' products. When users quickly incorporate each new or enhanced standard into their procurement policies, vendors will no longer find it profitable to drag their feet on implementing those standards. Instead, the first vendors to implement the standard properly will profit most.

Whether in procurement policies, closed-door account team meetings or elsewhere, market-driving users are voicing other interesting sentiments to vendors these days, such as:

- Systems integration is a task for vendors, not users. I want turnkey multivendor networking solutions that are based on standards, not proprietary techniques. Also, if you claim to offer integrated solutions, integrate your marketing and development efforts so I don't end up shaking a right hand that doesn't know what the left one is doing.
- Don't bother offering specially tweaked "standards implementations" that really work best only in networks dominated by your equipment. If you're not already a member of the Corporation for Open Systems, join now and help get its certification program under way as soon as possible.
- Nothing makes me madder than vendors who bury me in a mountain of irrelevant information just to obscure the fact that they can't meet my specifications. And don't waste my time with generic presentations — I'll cut you short and tell you to come back when you understand my business and have put some effort into figuring out how you can add value in my particular networking environment.
- In all my contracts, I'm now including a "statement of work" that specifies everything that's to be done and when, from installation through cutover to acceptance and beyond. If you come back later and say, "Our sales representative wasn't really authorized to offer that," I'll fight you all the way in court because I'd rather pay my lawyer than let you get away with the extra profit.

I'll also make certain the amount of money I hold back until acceptance is large enough to motivate you to take care of every last item on my punch list rather than walk away and forfeit the balance.

- Quit cloaking fixes in the guise of enhancements. I'm tired of seeing the two bundled together so you can charge me for things I've already paid for. I'm writing an 18-month free upgrade clause into all future contracts.

Also, when you upgrade a product, never omit existing features without asking me whether I still want them.

It's important to remember that, as long as everyone knows the game is hardball, no one who's paying attention will get hurt. ▣

— *The editors*

NETWORK WORLD

Features
November 2, 1987

A sporting network

From page 1

Department does the job well, few will know they were even there. However, one glitch that grinds the networks to a halt could bring the burning glare of the world's eyes upon them.

"The challenge for us is to build an entire data center and get the operators in place within 1½ years to support a two-week function. We're also expected to avert any downtime and provide an image to the world," said Emile Cote, manager of systems operations. "We feel the data processing and communications people of Calgary are going to reflect what Canadian computer professionals are capable of doing."

It's a challenge some of the more than 40 professionals in OCO'88's technology department left better paying jobs or their own businesses to meet. Some took early retirement from lifelong jobs so they could experience one last real adventure. Still others are meeting the Olympic networking challenge fresh out of college.

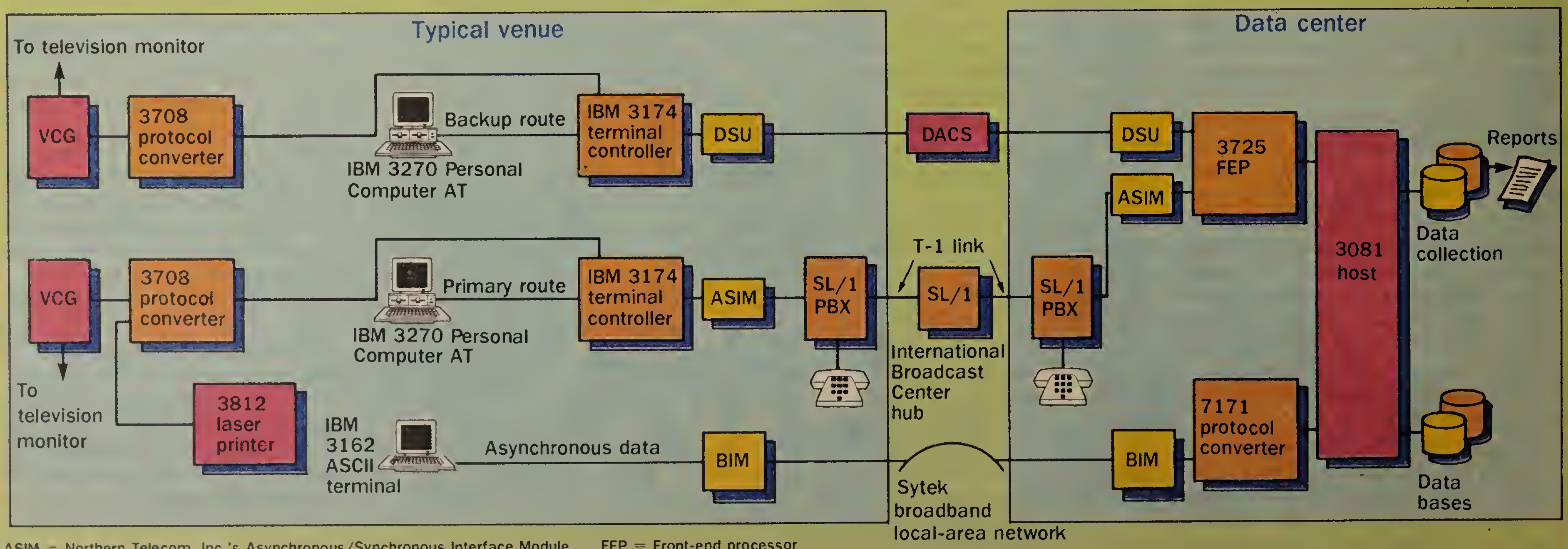
Once the Games start, the technology department will tap the professional staffs of nearby firms for roughly 950 experienced volunteers to operate the network. About 75 volunteers are needed for systems operation, while another 600 to 650 are needed for telecommunications.

The remaining volunteers will be assisting terminal operators at each venue where Olympic sporting events take place.

Volunteers and professionals alike share the goal of ensuring that the networks are functioning properly when 2,600 athletes and coaches, as well as 5,000 journalists and more than one million spectators, flock to Calgary for the Games, which will be held from Feb. 13 to Feb. 28. As the site of one of North America's largest rodeos — the annual Calgary Stampede — the city is accustomed to dealing with an influx of out-of-towners.

"This is not like a corporation, where you have the comfort of knowing that if you can't

Olympic data network



ASIM = Northern Telecom, Inc.'s Asynchronous/Synchronous Interface Module
BIM = Sytek, Inc.'s broadband interface module
DACS = Digital Access and Cross-connect System
DSU = Data service unit
FEP = Front-end processor
PBX = Private branch exchange
VCG = Video character generator

SOURCE: XV OLYMPIC WINTER GAMES ORGANIZING COMMITTEE

CALGARY

For the members of the XV Olympic Winter Games networking team, the challenge is to win without attracting the attention of the public.

make it work today you can make it work tomorrow. Here, it has to work today because competition will take place whether the networks are ready or not," says Kuba Sliwinski, supervisor of technical support.

Two multifunction networks

After consulting with organizers of past Games, OCO'88 officials decided to build two physical networks supporting four distinct functions. Those networks will link more than 60 Olympic sites, including sporting venues, athlete and press villages and administrative locations.

A private telephone network will provide basic telephone service to all Olympic sites. In addition, the telephone network will support an on-line synchronous data network that will quickly carry event results from sporting venues to a data center and will also enable Olympic security to check the identification of individuals to ensure that only accredited people gain access to restricted areas at the venues.

A separate broadband cable network will send television images to the booths of television announcers at each venue. That broadband cable will also distribute the asynchronous Info'88 network, OCO'88's official information network.

Expected to be the most visible network, Info'88 will enable journalists and other Olympic participants and officials to obtain event results, weather forecasts, athlete biographies, historical Olympic results and a multitude of other stored information. It will also provide such applications as electronic mail and word processing. Links from Info'88 to Telex facilities will enable journalists to write and transmit their stories using Info'88 terminals.

OCO'88 opted for two basic physical networks after meeting its first challenge, finding sponsors willing to exchange equipment for the rights to use the five-ring Olympic logo and Calgary's multipointed snowflake Olympic logo.

The major firms bellying up to the bar in a sponsorship program patterned after the 1984 Los Angeles Olympic Summer Games' are IBM, Northern Telecom, Inc., Motorola, Inc. and Alberta Government Telephone (AGT), which is the provincial equivalent of a Bell operating company. OCO'88 used its own funds to buy the Sytek, Inc. and Scientific Atlanta, Inc. equipment used in the broadband network.

Flashy technology nixed

Despite some temptations, OCO'88 decided it would not detract from athletes' efforts by employing flashy equipment, such as touch-screen terminals and other new technologies that would require expensive specialized techni-

Continued on next page

PHOTOS BY JIM BROWN

From previous page

cians. Instead, OCO'88 planners opted for tried-and-true technologies.

"We had to ask ourselves, 'What business are we in here? Are these the Olympic Games of high tech, or are these the Games of the athlete and sport?' And, of course, the answer always came out that these are the Games of the athlete. So we concentrated on what we could do to help stage the Games without technological frills that would elicit a gee-whiz type of response from the public," says John Russell, OCO'88 vice-president of technology. Russell spent 11 years with IBM and was a computer consultant in Alberta before taking over the helm of the technology department in late 1982.

OCO'88 had to lock in its network configurations in 1985 in order to ensure that pieces of the networks would be operational enough to support the Preview '88 events held last fall and winter. Preview '88 was a series of high-profile events such as world cup skiing and Canada Cup hockey that enabled OCO'88 to test some of its networks.

"Basically, anything that was not on the shelf or destined to be on the shelf by September of 1985 was not going to be included in our networks," recalls Nick Lundhild, manager of telecommunications.

IBM is supplying the ingredients of a Systems Network Architecture network, including a 3081 mainframe, OCO'88's primary processor and a 4381 mainframe that OCO'88 will use as a backup. IBM is also supplying 3725 front-end processors, 3174 terminal controllers, 3178 and 3162 terminals, 3270 Personal Computer ATs and XTs, 3812 laser printers, 3708 and 7171 protocol converters, and other peripherals and associated software, including the mainframe-based NetView network management package. IBM will also provide about 125 engineers and technicians to maintain IBM equipment.

"We're using mostly known and proven products. We haven't written a lot of special network code or done a lot of risky things," says Mark Dochtermann, coordinator of network systems. The approximately 50 on-line IBM SNA-based applications will be supported under MVS/XA, VTAM and CICS, he adds.

Northern Telecom will supply 15 SL-1 private branch exchanges linked via its Digital Trunk Interface (DTI) into a four-digit dial private telephone network of over 5,000 telephones and 48 9.6K bit/sec data lines. DTI is Northern's T-1 networking scheme for carrying 24 voice or data channels between PBXs.

According to Lundhild, the hub of the telephone network will be an SL-1 XT housed at the International Broadcast Center (IBC), which is located in the Big Four Building on Stampede Grounds, where the annual rodeo is held. A series of SL-1 MSs and SL-1 NTs will be linked to the SL-1 XT via 26 DTI T-1 lines.

As an official Olympic Sponsor, AGT will supply engineering services, telephone and PBX installation and equipment maintenance. But because AGT is a regulated public utility, OCO'88 is required to use its own funds to acquire AGT transmission lines.

Motorola will supply two-way radio and radio-paging equipment. Sytek will supply the data components of the broadband system, while Scientific Atlanta products will be used to support the video components.

Fast results

Although the simplest in concept, the SNA-based results-and-accreditation network is probably the most important. OCO'88 must transmit results from both judged and timed events to the data center and to scoreboards at each venue. The data center repackages the results and transmits

Continued on page 43

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Product Focus: Communications processors

Teaching old processors new tricks

Vendors are pitching new applications, price and features in a competitive market.

BY JOHN J. HUNTER
Contributing Editor

Users are finding that it's a buyer's market for communications processors, just as it is for most data communications products. Competition is intense, and markets aren't expanding rapidly. According to International Data Corp., a market research firm in Framingham, Mass., the communications processor market will grow at an annual rate of only 10% through 1990. Vendors, therefore, will have to pitch price, performance, service and special capabilities in order to hold onto existing customers and gain new ones.

In addition, many new products have appeared in the last few months. After almost a year during which IBM grabbed most of the headlines, Amdahl Corp. unleashed its Model 4725 on Sept. 15 to go head-to-head with IBM's 3725 and others of the same ilk. Amdahl says the 4725 is twice as fast as the IBM offering and less expensive.

Almost two months earlier, NCR Comten, Inc. announced its 5620XP, a powerful communications processor also aimed at the 3725. The 5620XP is rated more than twice as powerful as the previous models of the superquick 5620. Earlier in the year, NCR Comten enhanced the attractiveness of the 5660, 5620, 3695 and

Continued on page 41

Hunter is president of TMS Corp., a telecommunications consulting firm in Devon, Pa.

Communications processors

Vendor	Model	Product type	Host computer	Host interface ports	FEP emulated	Number of communications lines	Highest rate per line (bit/sec)	Protocols	Typical price
Advanced Computer Communications, Inc. Santa Barbara, Calif.	ACS 9310	FEP	IBM System/370, 43XX, 3XX	1	NA	1	3M	IEEE 802.3; TCP/IP	$29K
Amdahl Corp. Sunnyvale, Calif.	4705T	FEP	Amdahl 470, 580, 5890; IBM System/360, System/370, 43XX, 30XX	6	IBM 2705, 3705	448	64K; 90 lines at 1.544M	Asynchronous; IBM BSC, SDLC; HDLC; X.25; X.21	Quote
	4725E	FEP	Amdahl 470, 580, 5890; IBM System/360, System/370, 43XX, 30XX	6	IBM 3725	256	256K	Asynchronous; IBM BSC, SDLC; HDLC; X.25; X.21	$150K
Case Communications, Inc. Columbia, Md.	DCX 850	NP	Any	NA	NA	240	72K	Asynchronous; IBM BSC, SDLC; HDLC; X.25	$45K
Century Analysis, Inc. Pacheco, Calif.	OSI	FEP, NP	NCR Comten, Inc. 85XX and 98XX	3	NA	21	19.2K	Asynchronous	$11K
Chi Corp. Cleveland	CCP/3212	FEP, NP	Unisys Corp. 1100 or any mainframe supporting TCP/IP	8	Unisys DCPs	112	64K	Asynchronous; IBM 3270 BSC; X.25; TCP/IP; Unisys UTS; 802.3	$80K
Codex Corp. Canton, Mass.	6510NP	NP	Any	23	NA	24	64K	X.25	$16.2K
	6760	NP	Any	4	NA	256	19.2K asynchronous;	Asynchronous; synchronous; IBM BSC, SDLC; HDLC; Unisys Poll/Select; NCR Comten DDCMP; Honeywell, Inc. VIP	$20K
Computer Communications, Inc. Torrance, Calif.	CCI 8400 T1	FEP	IBM System/370, 30XX, 43XX; Amdahl 470	4	IBM 270X, 3737	4	1.544M	IBM BSC, SDLC; HDLC	$55K
Control Data Corp. Minneapolis	XN 10	FEP, NP	Any IBM host supporting VTAM 3.X	16	NA	192	64K	Asynchronous; IBM BSC; HDLC; TCP/IP; X.25	$275K
	CDC Net	FEP, NP	CDC Cyber Series	2	NA	64 per module	38.4 asynchronous, 64K synchronous	Asynchronous; IBM BSC, HASP; HDLC; TCP/IP	$20K
Digital Communications Associates, Inc. (DCA) Alpharetta, Ga.	3XX	NP	Any host	114	NA	114	72K	Asynchronous; IBM 3270 BSC, SDLC; HDLC; X.25, DCA proprietary	$16K

Chart continued on next page

Communications processors (continued)

Vendor	Model	Product type	Host computer	Host interface ports	FEP emulated	Number of communications lines	Highest rate per line (bit/sec)	Protocols	Typical price
Honeywell Bull **Phoenix**	Datanet 8/10	FEP, NP	Honeywell family	2	NA	31	56K	Asynchronous; synchronous; IBM BSC, SDLC; HDLC; X.25; Honeywell VIP	$44.3K
	Datanet 8/20	FEP, NP	Honeywell family	4	NA	127	1.544M	Asynchronous; synchronous; IBM BSC, SDLC; HDLC; X.25; Honeywell VIP	$85K
	Datanet 8/30	FEP, NP	Honeywell family	4	NA	255	1.544M	Asynchronous; synchronous; IBM BSC, SDLC; HDLC; X.25; Honeywell VIP	$244K
IBM **White Plains, N.Y.**	3720	FEP, NP	IBM System/370, 303X, 308X, 43XX	4	IBM 3705	60	64K	IBM BSC, SDLC; X.25	Quote
	3725	FEP	IBM System/360 Model 40 and up, System/370, 303X, 308X, 43XX	6	NA	256	230.4K	Asynchronous; IBM BSC, SDLC	Quote
Infotron Systems Corp. **Cherry Hill, N.J.**	892NP	NP	Any	8	NA	96	56K	Asynchronous; IBM BSC, SDLC; HDLC; Unisys Poll/Select; Honeywell VIP and GRTS	$11K
	990NP	NP	Any	15	NA	640	19.2K asynchronous; 64K synchronous	Asynchronous; IBM BSC, SDLC; HDLC; Unisys Poll/Select; X.25; Honeywell VIP and GRTS	$30K
KMW Systems Corp. **Austin, Texas**	8911A Channel Interface	FEP	IBM System/360, System/370, 30XX, 43XX	1	NA	256	1.2M	HDLC; IEEE 802.3	Quote
LemCom Systems, Inc. **Phoenix**	DNPE	FEP	IBM System/370, 30XX, 43XX	32	IBM 270X, 370X EP	1,000	64K	Asynchronous; IBM BSC, SDLC	$30K
Micom Systems, Inc. **Simi Valley, Calif.**	MB3	NP	Any asynchronous	NA	NA	10	19.2K	Asynchronous	$2.4K
Microtronics Systems, Ltd. **London, Ontario**	LSI X.25	FEP	All Digital Equipment Corp.	5 Unibus	NA	128 virtual	19.2K	Asynchronous; X.25	$15K
	KXT-X.25	FEP	All DEC	2 Q-bus	NA	64 virtual	19.2K	Asynchronous; X.25	$4K
NCR Comten, Inc. **St. Paul, Minn.**	3600	FEP, NP	All IBM hosts and selected NCR hosts	8	IBM 3705, 3725	512	64K	Asynchronous; IBM BSC, SDLC; HDLC	$96.7K
	5620XP	FEP, NP	All IBM hosts and selected NCR hosts	2	IBM 270X, 3725 Models 1 and 2	64	64K	Asynchronous; IBM BSC, SDLC; HDLC; X.25	$37.5K
	5660	FEP, NP	IBM System/360, System/370, 30XX, 43XX; NCR V-8500, V-8600, V-8800, V/E-9800	8	IBM 270X, 370X	1,024	9.6K	Asynchronous; IBM BSC, SDLC; HDLC	$703K
Netlink, Inc. **Raleigh, N.C.**	SNA-Hub	NP	Any IBM with VTAM	3	NA	15	64K	IBM SNA/SDLC	$20K
NTX Communications Corp. **Sunnyvale, Calif.**	NTX 3800	NP	IBM System/370, 303X, 308X, 43XX, 9370	4	NA	4	6M	IBM SDLC-like; switches host processors	$76K
Paradyne Corp. **Largo, Fla.**	Pixnet-XL	FEP	IBM System/370, 30XX, 43XX	2	NA	2	2.048M	HDLC; LAP B	$89K
Protocol Computers, Inc., **A Telematics International, Inc. Company** **Calabasas, Calif.**	SmartNet 3700	NP	Any host supporting X.25	16	NA	16	64K (4 links); 19.2K remainder	Asynchronous; X.25; HDLC; LAP B	$10K
Tandem Computers, Inc. **Cupertino, Calif.**	6100E	FEP	All Tandem NonStop	6	NA	161 asynchronous; 45 synchronous	19.2K asynchronous; 64K synchronous	Asynchronous; synchronous; IBM 3270; Unisys UTS, Poll/Select; IBM 2780/3780; Honeywell VIP 7800; NCR 725	$84.5K
Telefile Computer Products, Inc. **Irvine, Calif.**	Tele-Switch	NP	Any	NA	NA	30	153.6K	HDLC	$26K
Telematics International, Inc. **Ft. Lauderdale, Fla.**	Series 2000	NP	Any	NA	NA	480	230K	Asynchronous; synchronous; IBM BSC, SDLC; X.25	$50K
Timeplex, Inc. **Woodcliff Lake, N.J.**	Networking Microplexer	NP	Any	NA	NA	144	19.2K	Asynchronous; IBM BSC, SDLC; Unisys Poll/Select	$25K
Unisys Corp. * **Blue Bell, Pa.**	CP 2000 (Burroughs Corp.)	FEP, NP	Unisys B5900, B6900, B7900	25	NA	24	64K	Asynchronous; IBM 3270, BSC, SDLC; HDLC, X.25, Unisys Standard Poll/Select	Quote
	CP9585 (Burroughs)	FEP, NP	All Burroughs; IBM System/360, System/370, 303X, 308X, 43XX	127	NA	127	56K	Asynchronous; IBM 3270 BSC; Unisys Poll/Select	$40K
	DCP 15 (Sperry Corp.)	FEP	Unisys 1100 and 2200	2	NA	48	64K	Asynchronous; synchronous; Unisys UTS; IBM BSC; X.25	$28.5K
	DCP 40 (Sperry)	FEP	Unisys 1100 and 2200	16	NA	1,000	64K	Asynchronous; synchronous; Unisys UTS; X.25; IBM SNA; HDLC; DOD; DDN	$103K
Vitalink Communications Corp. **Fremont, Calif.**	NP III	NP	Any	8	NA	8	256K	IBM SDLC, HDLC; X.25; Unisys BDLC; TCP/IP; XNS; 802.3; 802.5	$19K to $24K

* Information obtained by Datapro Research Corp., Delran, N.J.

SOURCE: TMS CORP., DEVON, PA.

BDLC = Burroughs Data Link Control
BSC = Binary Synchronous Communications
DCP = Distributed Communications Processor
DDCMP = Digital Data Communications Message Protocol
DDN = Defense Data Network
DOD = Department of Defense
FEP = Front-end processor
GRTS = General Remote Terminal Supervisor

HDLC = High-Level Data Link Control
LAP B = Bit-oriented Link Access Procedure

NA = Not applicable
NP = Network processor
SDLC = Synchronous Data Link Control
SNA = Systems Network Architecture
TCP/IP = Transmission Control Protocol/Internet Protocol
UTS = Universal Terminal System
VIP = Visual information Projection
XNS = Xerox Network Systems

From page 39

3690 communications processors with the release of Version 4.0 of its Advanced Communications Function/Network Control Protocol (ACF/NCP). With a 23-bit addressing field, ACF/NCP ups the number of addresses available within a Systems Network Architecture network to more than eight million, vs. 65,000 with conventional 16-bit addressing.

This past year also saw the emergence of the channel extender. This unit allows host processors to pass information directly to each other on a channel-to-channel basis and permits remote terminal devices to attach directly to a host computer channel, bypassing the communications processor. So effective are channel extenders in a terminal environment that one user, a manufacturing concern, was able to reduce the number of host-resident data centers in its network without sacrificing performance. As the network manager, who asked not to be named, put it, "the users still think they're connected to a local host when it's actually five miles away."

In its June 1987 product announcements, Big Blue promised relief for NCP users wanting to change configurations. Eventually, users will be able to add terminals, lines and new transmission routing information to NCP definition tables without shutting NCP down first.

Things were also active in network processor land. Control Data Corp. introduced the XN10, a unit that functions as a communications processor and can link devices directly to a host processor block multiplexer channel at 3M bit/sec. The devices attached to the XN10 look like LU 6.2 PU 5 units to the host.

CDC also souped up its Datanet 8/20 and 8/30 by giving them a T-1 (1.544M bit/sec) data-handling capability. While that certainly will enhance throughput, the limitations of the communications protocols might steal some of the thunder. Most protocols are set up for transferring data in terminal mode, and, therefore, the block sizes are smaller and the protocols don't handle data as efficiently at speeds above 256K bit/sec. These limitations plague all communications processors.

Market aggression

The aforementioned new products from Amdahl, CDC and NCR Comten reflect aggressive price and performance. All three are faster than previous models and less expensive in terms of performance.

Wil Marshman, marketing manager of communications products for Amdahl, says the SNA market will remain a price/performance battleground but that users are looking for more functionality and diverse systems connectivity. "LU 6.2, PU 2.1 and [Open Systems Interconnect] will become big factors in the near future," he predicts.

To make their products more attractive to a larger portion of the market, many communications processor vendors have added X.25 interfaces for public packet networks and IEEE 802.3 and 802.5 support to permit interaction with local-area networks. Some have also announced support of Transmission Control Protocol/Internet Protocol or OSI to make their products compatible with diverse systems.

NCR Comten's director of marketing, Eric Birkeland, says his company is committed to OSI because "customers want connectivity among different vendors, and OSI is the way to accomplish that." He says most vendors realize this and are working toward implementing OSI. "It's going to take time, since all levels of OSI haven't been defined yet, but open systems are a good marketing opportunity, and vendors can't ignore that," Birkeland says.

T-1 interfaces also are being dangled in front of customers, but potential buyers should make sure the communications processor has the horsepower to handle data in the 3M bit/sec range and still provide acceptable performance. "A lot of processors get bogged down at T-1 rates, and performance suffers," says Dave Passmore, a principal with Fairfax, Va.-based communications consultancy Network Strategies, Inc.

Bypassing the processor

Even if the processor handles T-1 and higher rates efficiently, the communications protocol it labors under may not. Since most protocols are designed for low- to medium speed traffic (up to 256K bit/sec) and aren't efficient at higher speeds, companies with applications requiring high data rates are looking at bypassing the communications processor and doing direct host-channel communications. The device that allows that is the channel extender.

Channel extenders are being sold by such companies as Paradyne Corp., Network Systems Corp., NTX Communications Corp. and KMW Systems Corp. They're available for linking host processors and permitting terminal devices to attach directly to a host channel without going through the

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communications processor.

While direct channel attachment sounds simple enough, such interfacing requires extensive programming. "That's especially true with diverse hosts," Passmore cautions, "since it might require modifying the operating system. Otherwise it usually involves modifying VTAM tables. While that's not as difficult, it's still a job for a systems programmer."

Messing around with operating systems and communications software is an invitation to disaster, and the host processor vendor likely won't look kindly on it either. Even if the job is done right, the vendor might require that the user back out all changes before modification or troubleshooting can be done.

One company with channel extender experience is New Jersey Bell, at its facilities in Freehold and Madison, N.J. The company is using the NTX 3800 to link IBM 3088s located about 45 miles apart, and it's employing Timeplex, Inc. Link/1 T-1 multiplexers as the communications interface. According to Art Tarricone, systems analyst for New Jersey Bell, the NTX has established four channels at each site and is handling high-volume, tape-resident data transfers as well as interactive (IBM 3270) traffic.

Tarricone says the NTX units were brought in to bypass a communications processor too slow to handle large bulk file transfers. "We needed larger block sizes and transfer rates than the communications processor could handle, and the NTX did the trick," he says. New Jersey Bell is currently running the Link/1s at 384K and 576K bit/sec with bulk data being sent during off-peak hours.

Tarricone noted that the NTX uses software to access VTAM. "If you make a mistake doing changes," he says, "you will crash VTAM." He also mentioned that NTX is now beta testing a new version of the 3800 that will interact with VTAM on a program CALL level, which should remove the danger of VTAM crashes. Richard LeCour, vice-president of marketing for NTX, acknowledges that a crash can occur if users don't follow recommended procedures and confirms Tarricone's comments concerning new NTX software.

Channel extenders can also increase interactive performance by allowing users to bypass the communications processor. Paradyne's Pixnet-XL is one of the better known terminal-to-host channel products and allows devices that usually attach directly to a local host to communicate with a remote one while giving the illusion that they're still locally attached.

One user confirmed that Paradyne's pitch isn't an exaggeration. This Pixnet-XL customer, who asked to remain anonymous, works in a principally IBM 3270 shop running Model 3800 Laser Printers. The IBM 3274 controllers are interfaced to Pixnet-XL, which are linked to data centers through T-1 multiplexers. The Paradyne products have allowed the shop to remove five data centers, with no degradation in service.

"We still have seven different locations with 3270s, but only two data centers are needed to service them. Our longest [Pixnet-XL] run is 600 miles, and the shortest is five. We've heard no complaints about degradation," he says.

The Pixnet-XL also allows host-to-host direct channel communications, but it doesn't operate as a streaming device. According to Paradyne, the data is transferred at 32K bit/sec for the MVS operating system and 64K bit/sec for MVX/XA. These speeds are considered too slow to transfer large files efficiently.

Will channel extenders mount a threat to front-end processors? "They're certainly competition for high-speed point-to-point applications, but they can't handle gateway functions, and they don't do switching among processors," NCR Comten's Birkeland says. While channel extenders can't perform channel switching the way communications/network processors do, they can be configured with separately targeted channels to feed more than one host. "With the 3800, we can direct data to four different [user-specified] hosts," NTX's LeCour says.

Wrap-up

Vendors are attempting to attract customers by offering multifunction products, increased transmission speed and connectivity. As the accompanying comparison chart shows, many of the units can operate as communications and network processors by swapping software, control logic boards and, in some cases, I/O interfaces. Most vendors also allow their products to be field-upgraded with more memory, I/O channels and links to host processors.

In determining line support, users should keep in mind that the line-handling capacity of many products is halved under full-duplex, vs. half-duplex, operation. The speed of the transmission also adversely affects the number of lines that can be handled. For this article, the total number of lines shown in the comparison chart re-

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flects half-duplex operation and the lowest operating speed, typically 1,200 bit/sec.

Network processors usually don't differentiate between I/O lines and host links, and users are free to configure them to suit the application. Therefore, the column headed "Host interface ports" in the chart contains a "not applicable" indication, unless the vendors specified otherwise.

Price is one of the trickiest things to establish, since it involves many hardware and software variables. Therefore, vendors were asked to supply prices for typical systems sold. In most cases, these turned out to be units configured with half the capacity the system can support.

A sporting network

continued from page 38

them back to a video character generator, which feeds the data to monitors in television announcer booths at each venue. As part of its agreement with broadcasters, OCO'88 must provide those results to the booth no more than 30 seconds after each athlete concludes a performance.

To support judged events such as ski jumping, judges use Daktronics, Inc. keypad terminals, which are linked via RS-232 lines to a Daktronics Communications Interface Adapter (CIA). Once an event is complete, the CIA collects scores from each judge's terminal and transmits them asynchronously to the print buffer of a 3270 Personal Computer AT, which is capable of emulating a 3270-type terminal.

For timed events such as downhill skiing, Swiss Timing Ltd., a joint venture between Omega Electronics Ltd. and Longines Electronic Timing, has placed a series of photocells at strategic locations along the race courses. These photocells cast a beam of light across the course and record a time as athletes break each beam. A final time is recorded at the finish and relayed to a calculation room at each venue where it is entered onto the 3270 Personal Computer AT.

The 3270 Personal Computer AT is linked to a 3174 terminal controller. It converts the data to a 3270 data stream and sends it to the controller at 9.6K bit/sec. That controller is linked to a Northern Telecom Asynchronous/Synchronous Interface Module (ASIM), which inserts the data into a DTI channel. The DTI transmits the data via the voice network at 9.6K bit/sec to a PBX at the data center. Another ASIM there plucks the data from the switch and sends it to a 3725 front-end processor connected to both the 3081 and 4381 hosts. The data is then logged to a CICS transaction.

A 3178 terminal operator at the originating venue accesses the data to ensure it contains the athlete's name, country, score or time and other information before loading it into the mainframe as an IMS data base file. Another 3178 operator accesses the host to compile a list of competitors in every event and directs that information to a 3812 laser printer at each venue. Those lists, providing the names of 15 competitors at a time, are made available to the media periodically as unofficial results. The host system sends the data to a 3708 protocol converter at the venue, which converts the 3270 data stream to ASCII data and feeds it to announcer booth monitors via the video character generator.

Because of the results system's importance to the Games, OCO'88 made it completely redundant. Results are fed to two different controllers attached to 3270 Personal Computer ATs. One transmits via a DTI channel; the other transmits via AGT's fiber-optic-based Altanet and Citinet digital data services. The backup system will log results to disk unless the primary system fails.

In the event of such a failure, NetView has been configured to instruct the backup system to start transmitting its copy of the results automatically after the primary system has been down for 10 seconds or more. The backup system will continue transmitting until operators can isolate and solve the problem on the primary system.

Participant accreditation

Even before results start flowing, the SNA network will be used to register athletes and coaches as they come into town at Calgary International Airport.

OCO'88 will set up four registration stations at the airport, each of which will be served by its own controller, 3178 terminals and 3812 laser printers. Each athlete and coach will spend roughly three minutes checking in and will receive a bar-coded badge.

Each day, a file of people accredited to enter restricted areas of venues will be downloaded via the SNA network to a personal computer at each venue. OCO'88 personnel with bar code readers will check the badge of each person attempting to enter a restricted area.

Capacity planning for the results-and-accreditation network was fairly simple. "Every couple of minutes, an athlete breaks a few photocells or is scored by a judge. That data moves to the mainframe,

Continued on page 51

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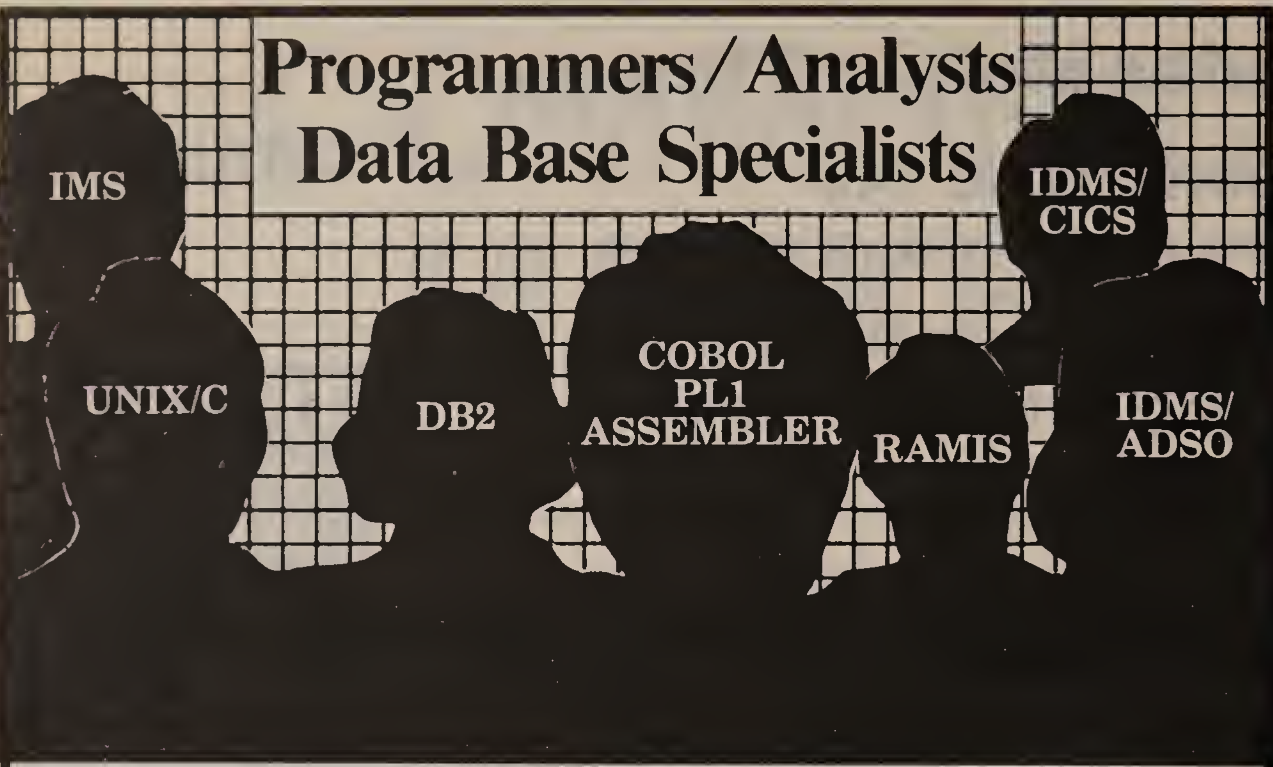

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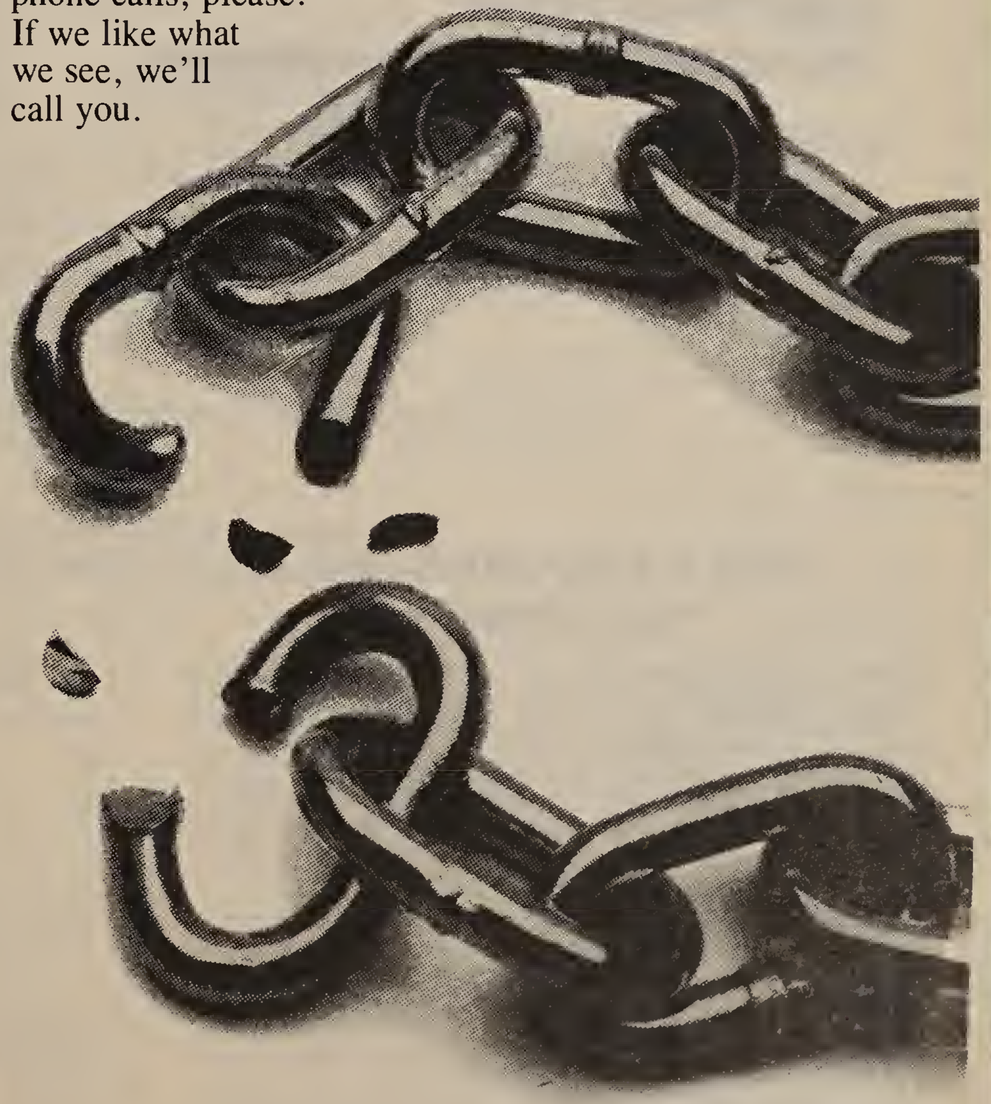

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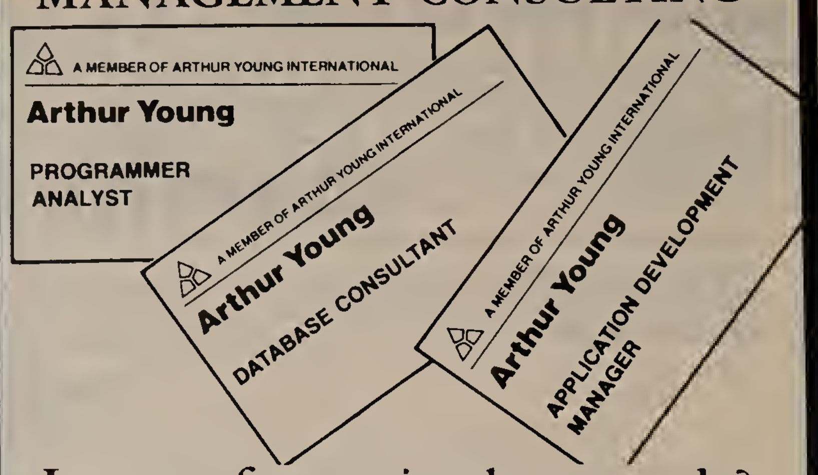
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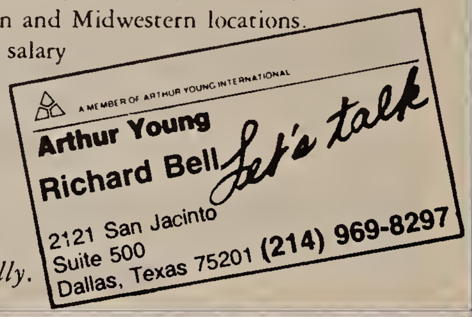

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A sporting network

continued from page 43

and the transaction is over," Russell explains.

"But," Dochtermann adds, "those simple events have a domino effect. The moment the race is over, thousands of people rush to an Info'88 terminal to find out what happened."

And that is exactly why OCO'88 put Info'88 on the broadband network, which will challenge Vancouver's Knowledge Net for bragging rights as Canada's largest broadband network.

Info'88 consists of more than 600 IBM 3162 ASCII terminals. Those terminals link to the broadband system via Sytek interface modules. A series of 7171 protocol converters attached to the host systems convert 3270 data streams to ASCII data, which then flows over the broadband system.

Most Info'88 terminals will be located at the main press center at the Roundup Centre on Stampede Grounds and a subcenter at Canada Olympic Park, which is on the outskirts of downtown Calgary. Other subcenters are located at the Nakiska at Mt. Allan and Canmore Nordic Center ski venues, each of which is 60 miles west of the city.

Info'88 terminals can also be found scattered throughout hotel lobbies and located at other Olympic sites.

"Putting asynchronous data on the same broadband network as television turns out to be millions of dollars cheaper than sending the data via traditional SNA. Especially when you take into account the broadband network was going to be there in the first place," observes John Way, supervisor of broadband services.

Way is overseeing the installation of three 40-channel Sytek 2000 mid-split cable television broadband local-area networks. A local-area network consisting of 43 miles of cable will serve downtown Calgary. Two others, comprising a total of three miles of cable, will be installed at Nakiska and Canmore.

Television feeds from the Canadian Television Network (CTV), a commercial network chosen as the host broadcaster for the Games, will be fed via the broadband system to announcers' booths at each venue. Signals from downtown venues will also be fed to the IBC via broadband.

Because of the distance from downtown, a cable to link Nakiska and Canmore to the IBC was not installed. Instead, local networks at those sites will simply send video images to announcers' booths on-site. To bring signals from Nakiska and Canmore to the IBC, CTV will utilize satellite facilities provided by AGT.

At the IBC, the feeds from each downtown venue and the satellite feeds from Nakiska and Canmore will be sent back out over the downtown broadband local-area network for distribution to all downtown Olympic sites.

Also at the IBC, broadcasters from around the world will choose the images they want, mix in the audio of their announcers and beam the signal to their homelands via satellite facilities.

Traditional 56K bit/sec links will bridge the three separate broadband local-area networks to ensure the Info'88 network will be distributed to all Olympic sites.

Network legacy

As its legacy to Calgary, the technology department will donate the broadband network to the city. The city will operate the system, which will enable educational institutions and hospitals to exchange data. Other equipment will be packed into boxes and auctioned off.

The networks will not be completed until the day before the opening ceremonies. Because some venues are being used for other events prior to the Games, a few wires on the SNA and broadband networks can't be installed until several weeks before the Games start.

For example, the Roundup Centre on the Stampede Grounds will be hosting other events until a few weeks before the Games. When the building is vacant, OCO'88 personnel will begin to mold its oft-changed interior to their needs. The technology department will be the last to enter the building during the 48-hour period preceding the Games in order to get roughly 130 terminals up and running.

"Athletes preparing to make a 90-meter ski jump have their challenge. Trying to get these networks into place and operating before the Games start is our challenge," Sliwinski says. "At this point, I don't know what is more challenging. Making that 90-meter ski jump or putting in 130 terminals within 48 hours."

Apollo unveils LU 6.2 software

continued from page 9

6.2 protocol."

Spectrum Concepts, Inc. developed the first turnkey file transfer application that works with the new Domain LU 6.2 software. The XCOM 6.2 program, which Spectrum originally developed for IBM hosts and ported to the Domain LU 6.2 program, allows Apollo workstation users to exchange files with IBM mainframes, System/38 minicomputers, Personal Computers and compatibles, and Digital Equipment Corp. VAX hosts. Modules of the XCOM 6.2 program, which Apollo will sell by reference, must run in the host as well as in the workstation network.

The Domain LU 6.2 software and XCOM 6.2 reside in a gateway node linked to an Apollo Domain network. The gateway can be either an Apollo DSP90 server or a DN580/DN590 Turbo workstation configured with a synchronous controller card that provides a remote connection to IBM hosts over 56K bit/sec links. Domain LU 6.2 supports up to 254 logical units, or sessions, per gateway, and it supports parallel sessions with a remote host. It also includes a menu-driven system administration utility that allows network managers to configure programs.

Also last week, Apollo announced enhancements for its Domain/SNA-3270 terminal-emulation software. Enhancements include support for a mix of IBM 3270 terminal emulation, including 3278 Models 2, 3, 4 and 5 and a four-color 3279 terminal. The enhanced emulator also provides windowing, allowing a host application to run in one window while a workstation application is running in another. Information can be electronically cut and pasted between the applications.

The Domain/LU 6.2 software is priced at $6,000 and will be available in December. Domain/SNA-3270 hardware and software together is priced at $7,650. XCOM 6.2, which includes modules that run on the Domain gateway and on the remote host, will be available from Spectrum at the end of January for $3,500 per computer.

Firm sues BOC, Boeing

continued from page 9

claim to be submitted to the government, according to BCI's suit.

BCI alleges that Bell Atlanticom inflated costs billed to Boeing in other instances as well. In addition, BCI said officials of Bell Atlanticom made slanderous statements about BCI and its employees, statements that harmed their reputations and the company's ability to obtain work.

When BCI attempted to bid on other government contracts in competition with Bell Atlanticom and Boeing, the two firms tried to prevent that competition by withholding payment for work BCI had done for the two firms. BCI claims these attempts to suppress competition are in violation of federal antitrust laws.

BCI also alleges that Boeing and Bell Atlanticom unlawfully obtained copies of bids that BCI submitted for government contracts and that the two firms hired away BCI's key technical staff "to inhibit BCI's ability to compete on an equal basis."

Documents submitted to the court by BCI indicated that Boeing planned to bill NASA for the legal expenses it incurred during this private lawsuit. Boeing officials now say that was an error, and Boeing will not charge NASA for its estimated $1 million in legal fees.

BCI also alleges that Boeing and Bell Atlanticom unlawfully obtained copies of bids that BCI submitted for government contracts.

NASA officials have given testimony in the case, but NASA is not a party to the suit, according to NASA Chief Counsel Susan Smith.

The U.S. Department of Justice Antitrust Division, which is responsible for the divestiture of the regional Bell holding companies and for monitoring any possible antitrust violations by the RBHCs, said it was unaware of the pending BCI suit.

"I don't believe this antitrust case has been brought to the attention of the Antitrust Division," said staff attorney Michael Altschul, "and I can't tell whether we would monitor this case without first looking at the suit."

PBX vs. Centrex

continued from page 34

this control and flexibility. With Centrex SMDR, the local telephone company provides data on a magnetic tape to coincide with its own billing period, which may or may not coincide with the company's billing requirements, and may or may not be able to include records of all trunk groups, such as local calls.

Additionally, the tape is generally received five to seven business days after it is processed and then must be processed again, at additional cost, to provide meaningful reports.

This delay is not only costly, but could impact the timeliness and effectiveness of the reports.

■ **SMDR limitations.** Lastly, it's also important to note some limitations inherent in Centrex SMDR. When multiple WATS lines to the same service area are utilized, the completed calls will all be recorded on a single billing number for the group, not by individual line.

Also, when the WATS billing cycle is different from the Centrex billing cycle, the bills will not be synchronized.

Many RBHCs now offer SMDR to premises (SMDR-P), which interfaces with customer premises via a data link and allows for on-site, on-demand processing. But, at an additional cost of about $300 to $500 per month, its cost-effectiveness is questionable.

■ **Moves and changes**. PBXs have, for some time, provided users with the ability to make simple moves and changes by means of an on-site administrative panel. The RBHCs, in an attempt to make Centrex more competitive, have also begun to offer this feature.

However, most Centrexes still require a service order for billing changes, such as adds and deletions. In some instances, this can cost $500 to $600 per month, plus the cost of the service orders and a one-time installation charge of about $5,000.

The PBX advantages become even more pronounced when multiple locations are involved. While most major PBX vendors offer centralized SMDR and administration capabilities, it is improbable that this could be accomplished with Centrex systems across RBHC boundaries.

Before making a decision between Centrex and a PBX, users must examine their situations carefully and evaluate each system on its own merits.

Wall St. woes menace budgets

continued from page 1

1988 budget. If we went into a recession, however, I'm sure it would have an impact."

Rick Manser, corporate manager of telecommunications with Boston-based Gillette Co., said, "The market changes haven't had any impact on my plans for next year."

Experts part when predicting the likelihood of a recession in the coming year, but most admit the stock market decline is a harbinger of slowed consumer and capital spending. "I'm not predicting a recession," said David Wyss, chief financial economist with Data Resources, Inc., a research firm in Lexington, Mass. "But it seems much more likely than it did a few months ago, and I expect we'll see a decline in capital spending as a result of the crash."

Some users have adopted a wait-and-see attitude, while remaining optimistic about the economy. "We won't make a real judgment about the economy or our spending for a few months yet, but I don't think we're heading into a recession of any significant proportion," commented Joe Gallo, communications manager with Automatic Data Processing, Inc. "We made plans for a second data center, and I still have the go-ahead on that."

Others said their companies realize that some communications expenses will save money over the long term and are therefore justifiable despite economic conditions. "My company remains committed to a planned, major network project. We recognize that delaying [the project] would cost us more money," said Michael Morse, assistant vice-president of electronic data processing project management with Merrill Lynch, Pierce, Fenner & Smith in New York.

Although most companies have decided to keep a close watch on the economy before curbing expenses, cuts are inevitable, according to Joseph Joyce, assistant professor of economics at Wellesley College in Wellesley, Mass. "Just because people aren't changing their budgets on a dime doesn't mean they are oblivious to what's going on," he observed. "If the market stays relatively depressed like this, it will certainly affect companies' capital spending."

Some users have already felt the impact, particularly those who work for companies directly involved in the financial markets. Chuck Garrison, communications manager of the Chicago Board Options Exchange, said, "I was within hours of placing a $1.1 million purchase order when the word came to put expenditures on temporary hold." Garrison said three major projects have been postponed. "We'll be conservative in the next few months as we assess the impact of the stock market."

Financial companies are the first to feel the brunt of a market collapse, but some experts said no one will emerge unscathed if consumer spending goes soft, a situation many predict. Inevitably, slowed consumer spending begets slowed capital spending; as companies take in less revenue from consumer purchases, they must slash budgets to maintain margins.

"When people are uncertain about the economy and their jobs, they are reluctant to buy," explained Tom Riddell, associate professor of economics at Smith College in Northampton, Mass. "The first areas to be affected are consumer durables, housing and the automobile industry," Riddell said. Thus, major retail chains and manufacturing operations are among those that would suffer losses in revenue early in the game.

Those companies then "eliminate or postpone major capital purchases for expanding an operation or marginally improving efficiency, and I suspect that communications equipment would be considered such an expense by companies that don't depend on it for their core business," Riddell concluded.

But Julian Gingold, a senior vice-president with Dean Witter Reynolds, Inc. in New York, disagreed. "Other expenses would go before communications. In fact, vendors often offer deals in hard times, which can lead to increased spending." Gingold said basic equipment would probably continue to sell, while sales of sophisticated equipment could be hurt.

While no service or product is recession-proof, some are less likely to suffer a sharp drop in usage in the event of an economic slowdown, such as long-distance services, insurance and food.

Seth Lewis, communications manager with Home Insurance Co. in New York, said, "A recession would have less impact on us than on many companies. We've always had tight cost control, and that won't change, but I don't think we'll have to react to a change in the economy as much as others will."

And pizza remains popular no matter what the state of the economy, according to Dan Gonos, a project manager with Domino's Pizza, Inc., headquartered in Detroit. "In boom times, the executive class eats at restaurants, and the working class orders pizza. In a recession, the working class drops out of the market, but the executive class tightens its belt and starts ordering pizza instead of eating out. So this won't affect my plans," he said.

CALENDAR

Nov. 5, New York — Inside Wire: Untangling the Confusion. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Nov. 9, Bethesda, Md. — The Postdivestiture Tariffs and Their Impact on Large Networks. Contact: Michele Zbiegniewicz, The Aries Group, Inc., 1500 Research Blvd., Rockville, Md. 20850.

Nov. 9-12, Detroit — Autofact '87. Contact: Computer and Automated Systems Association of SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Nov. 11-13, Los Angeles — Localnet '87. Contact: Conference Management Corp., Box 4990, 200 Connecticut Ave., Norwalk, Conn. 06856.

Nov. 11-13, Boston — Understanding SNA: Advanced Networking Architectures. Contact: Communications Solutions, Inc., 2125 Hamilton Ave., San Jose, Calif. 95125.

Nov. 12-13, Washington, D.C. — Next Generation Network Switches: Understanding How Tomorrow's Network Architectures Will Impact Your Business. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Nov. 15-18, Orlando, Fla. — Telecommunications: A Strategic Resource. Contact: Southeastern Telecommunications Association, P.O. Box 901, Richmond, Va. 23207.

Nov. 16-18, San Francisco — IBM's Token-Ring Network: Understanding and Implementation. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Dec. 2-4, Los Angeles — Hands-On PC Networking. Contact: John Valenti, Integrated Computer Systems, 5800 Hannum Ave., Culver City, Calif. 90231.

Dec. 8-9, New York — Communications Opportunities Strategy Conference. Contact: Quantum Consultants, Inc., 1114 Avenue of the Americas, New York, N.Y. 10036.

Dec. 10-11, Piscataway, N.J. — Local-Area Networks: Concepts and Components. Contact: CCN Associates, 127 Park Ave., Maplewood, N.J. 07040.

Dec. 16-18, New York — 1987 Microcomputer Graphics Show and Conference. Contact: Susan Werlinich, Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Jan. 25-28, Washington, D.C. — Communications Networks. Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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▶ *PRODUCT COMPARISON*

Call back for access control

BY JOHN J. HUNTER
Contributing Editor

A few much-publicized "hacker" incidents and stories about disgruntled employees altering or obliterating corporate data have generated great interest in data protection schemes among network managers. Increasingly, these managers are being required to take measures to protect corporate data bases from tampering.

For companies with big bucks or paranoia, many data encryption devices are available that will block even the most talented data thieves. A less expensive, albeit less effective, way to protect information is to install a device that blocks dial-in terminal or personal computer users before they reach host communications ports. These network access control devices sit between remote dial-in users and host computer ports and block illegal callers by verifying user identification codes and calling back the user.

LeeMah Datacom Security Corp.'s TraqNet and Digital Pathways, Inc.'s Defender II are two such products. Both are callback devices that intercept incoming requests for port connection, examine the caller's ID and then call the user back using the telephone number associated with the caller's ID. The associated return telephone number is the key to this security plan, since someone using an illegally obtained access code probably won't be calling from the legal telephone number.

Either system can also be configured to permit direct connection without a callback. The user's ID is verified and the call request is passed directly to the host. The reason for this apparent breach of security is to accommodate users calling from temporary numbers or for situations where a telephone operator will intercept all incoming calls.

Callback fallback

Both products allow users to change callback procedures. With LeeMah's variable callback capability, the user calls, enters an ID and gives the system a different telephone number to call back. While this capability is handy for authorized users needing temporary access, it's also a convenient way for someone who has stolen an ID to access the system.

Digital Pathways' controlled dial-through access feature is no more effective. The user calls, enters the ID, and the system provides a code that defines the port number on which the user can call back.

While both schemes allow only temporary access, that's all someone bent on doing damage needs.

Fortunately, both TraqNet and Defender II can block such illegal access through use of a handheld random password generator. This unit looks like a pocket calculator and is programmed to produce randomly generated access codes that the user sends to the controller via a terminal or push-button telephone.

TraqNet and Defender II both offer another security feature to foil illegal callers using an autodial modem. Called a silent answer, it masks the host modem handshake tones until a legal ID is entered. This blocks hackers, since they aren't aware that they've made a connection. In addition to using IDs, both products allow the system administrator to assign users to different access groups, which determine when they can call. For example, users can be restricted according to day, time and specific dates. A legal ID but the wrong time results in no connection.

Analog devices

TraqNet and Defender II sit between the caller's modem and the modems associated with the host computer ports. Since they're on the analog side of the communications network, they're protocol-insensitive and, therefore, can be used with any type of modem. Both products can use the system's modems to interact with remote callers, or they can use their own internal modems.

Digital Pathways offers a series of internal modems for its Defender II. A quad modem card contains four multispeed units that are compatible with smart modems. Each modem can be configured in either autoanswer or originate-only mode, and both are available in CCITT V.22bis asynchronous or 1,200 bit/sec AT&T 212A units. They cost $3,250. A quad board with four 212As is $2,250.

Also available is a dual modem card containing two high-speed (up to 9.6K bit/sec) units that use the Packetized Ensemble Protocol, which adapts the modem's transmission rate to line operating conditions. Primary operating speed is 9.6K bit/sec, with 2,400, 1,200 and 300 bit/sec fallback rates. The dual-modem card costs $3,000.

Defender II can also be fitted with internal protocol converter boards that work with the aforementioned modems. The boards convert asynchronous protocols to IBM 3270 Systems Network Architecture/Synchronous Data Link Control or Binary Synchronous Communications. Each Defender II can be configured to handle up to 48 asynchronous lines. The protocol converter board accommodates eight channels and costs $6,000.

LeeMah's modem offerings comprise an integrated single-line 212A modem card for $475 and a stand-alone 2,400 bit/sec modem with an error-correcting Microcom Network Protocol called TraqNet 724S (LeeMah did not provide a price by press time). The latter unit meets AT&T 212A, 103 and V.22bis standards and supports the Hayes Microcomputer Products, Inc. AT command set.

Two network access control devices compared

	Vendor/Product	
	LeeMah DataCom Security Corp. Hayward, Calif./ TraqNet	Digital Pathways, Inc. Mountain View, Calif./ Defender II
Number of lines handled	12,800	768
Number of user IDs	20,000	4,000
Price	$6.5K, $25K and $65K for 8, 48 and 128 lines	$7.1K, $11.8K and $24K for 8, 16 and 48 lines

SOURCE: TMS CORP., DEVON, PA.

One big objection to callback systems is the cost associated with making return calls. Both products soften that objection somewhat by conducting an outgoing line search to determine the least expensive route on which to call back.

Users can be designated to receive calls based on least-cost routing or through WATS, foreign exchange lines or discount carriers like MCI Communications Corp. They can also be assigned a priority that the system uses to select a secondary route, should the primary route be busy.

Both Defender II and TraqNet maintain an audit trail of successful and unsuccessful access attempts that can be printed out or routed to a personal computer for storage and analysis. The captured information shows call date and time, event status (such as ringing, connected or idle), incoming line used, outgoing line used, disconnect time and date, and user identification. TraqNet also shows users' names.

In addition to the audit trail information, both systems offer optional software that permits a terminal or personal computer to dislay system status in real time, including the status of each channel card slot and its operating mode, such as busy, callback and answer.

Standard features

TraqNet is available in the stand-alone B-Series and the networking N-Series. The latter permits up to 100 TraqNet Series 2XXXN systems to be joined as one integrated network that can be configured and monitored from one central location.

LeeMah says up to 12,800 dial-up lines and 20,000 user IDs can be configured. While that's true, there is a rub. To integrate the systems, a separate Network Interface Unit (NIU) must be used to link the units. The NIU, however, has only 15 RS-232-C ports for attaching Series 2XXXNs, which means that only up to 1,920 lines can be simultaneously monitored on a continuous basis.

A LeeMah representative acknowledges the 15-port limit but says the ports can be used to dial in to and establish connection with 100 Series 2XXXNs. While that might be considered networking, it's not what most people consider integrated operation. No price for the NIU was available at press time.

The stand-alone LeeMah 1016B, 1032B and 2128B have top line capacities of 16, 32 and 128 lines.

The Series 2000N is offered in models supporting up to 8, 32 and 128 lines for the Models 2008N, 2032N and 2128N respectively.

Defender II can also be configured as a stand-alone or networked system, but its line-handling capacity of up to 768 lines and 4,000 IDs is well below the LeeMah offering. Model 8+, 16+ and 48+ handle 8, 16 and 48 lines, respectively. According to Digital Pathways, up to 15 slave, or expansion, chassis supporting 8, 16 or 48 lines can be configured as an integrated system with no additional hardware or software required.

In summary, both systems enjoy a fine reputation and are the leaders in their field. With the exception of their line-handling capabilities, both are similar in terms of overall services offered.

The Defender II, however, offers a few options unavailable with TraqNet, such as the dual- and quad-board modems and the IBM 3270 protocol converters. The latter permits direct communications with IBM hosts without external or third-party products.

But for overall networking power, TraqNet's capability to link 15 Model 2XXXNs directly and 100 through dial-up connection is unequaled. ◻

Hunter is president of TMS Corp., a telecommunications consulting firm in Devon, Pa.

Network World is seeking authors to write comparative reviews of network-related products. If you're both a writer and an expert on data, voice or video networking products, contact Steve Moore, features editor, at (617) 879-0700, ext. 732. Respondents may not be employed by vendor companies.

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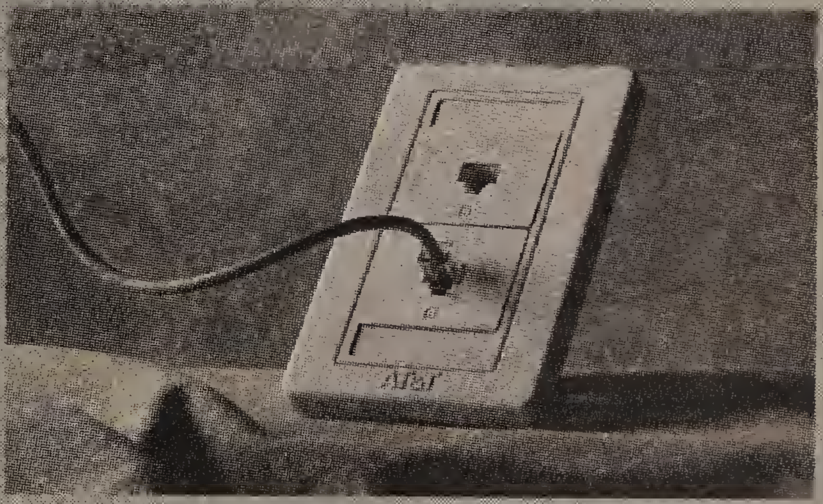

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